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# **AIRMAN'S INFORMATION MANUAL**

## **ATC OPERATIONS AND PROCEDURES**

### **SECTION II**



**EFFECTIVE      AUGUST 1965**  
**TO      DECEMBER 1965**

**FEDERAL AVIATION AGENCY**



# **INTRODUCTION**

## **Section II—ATC OPERATIONS AND PROCEDURES**

Section II, ATC Operations and Procedures, is designed to serve as an official means of disseminating pertinent air traffic control information of interest to pilots of varied experience levels. The material is presented in layman's language to lessen the ambiguity which sometimes results from individual interpretation of rules, regulations and procedures.

The information published, governing flight operations, air traffic services and procedures within the conterminous United States is arranged and sequenced in accordance with that of a typical flight operation; i.e., preflight, departure, enroute, arrival and landing.

Supplemental to the sequenced flight operations, are supporting general and emergency information and procedures such as U.S. Entry and Departure Requirements, Air Defense Identification Zone (ADIZ) and SCATER procedures.

The Section concludes with Emergency Procedures. These procedures have been consolidated and placed last in the Section for quick and ready reference.



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## PREFLIGHT

## GENERAL

**1. Every pilot is urged to receive a preflight briefing and to file a flight plan. This briefing would consist of weather, airport, and enroute naval information. Briefing service may be obtained from a Flight Service Station either by telephone/interphone, by radio when airborne, or by a personal visit to the Station.**

## WEATHER BRIEFING

**1. Consult your local FAA Flight Service Station (FSS) or Weather Bureau Airport Station (WBAS) for preflight weather briefing.**

**2. When telephoning for information, use the following procedure :**

**e. Identify yourself as a pilot. (Many persons calling WB stations want information for purposes other than flying.)**

**b. State your intended route, destination, proposed departure time and estimated time en route.**

**c. Advise if you intend to fly only VFR.**

d. When talking to an FSS, you will be asked your aircraft identification for activity record purposes.

[illegible]

**CLOSE FRONT FLAPS UPON ARRIVAL.**

**3. You are urged to use the Pilot's Preflight Check List which is on the reverse of the flight plan form. The Check List is a reminder of items you should be aware of before beginning flight. Also provided beneath the Check List is a Flight Log for your use if desired.**

## FLIGHT PLAN—VFR

## 1. GENERAL

**a. A flight plan is not required for VFR flight, however, it is strongly recommended that one be filed. This not only assures prompt search and rescue action in event you become overdue or missing, but it also permits en route stations and the destination station to render better service by having prior knowledge of your flight. All VFR flights, whether on a flight plan or not, should make regular position reports to FAA Flight Service Stations to receive altimeter settings and weather safety advisories.**

**b. Flight plan forms are available at all Flight Service Stations. A flight plan may be filed with the nearest Flight Service Station or airport traffic control tower, either in person or by telephone. Aircraft radio may be used to file if no other means are available. Some states operate aeronautical communications stations and most of these will accept flight plans which are then sent to FAA for further handling.**

FEDERAL AVIATION AGENCY <b>FLIGHT PLAN</b>				FORM APPROVED BUDGET BUREAU NO 66-50-11	
1. TYPE OF FLIGHT PLAN  <input type="checkbox"/> PWK <input type="checkbox"/> VFR <input type="checkbox"/> IFR <input type="checkbox"/> DVFR		2. AIRCRAFT IDENTIFICATION		3. AIRCRAFT TYPE	
4. ORIGIN CRUISE/ARRIVAL		5. ROUTE OF FLIGHT		6. TIME ARRIVED  HOUR	
7. POINT OF DEPARTURE		8. ESTIMATED TIME ENROUTE			
9. COMMENTS (Name of airport and city)		10. ESTIMATED FUEL ON ROUTE HOURS		11. FUEL ON BOARD HOURS	
		HOURS		HOURS	
12. AIRCRAFT AIRCRAFT					
13. REMARKS					
14. PILOT'S NAME		15. PILOT'S ADDRESS OR AIRCRAFT REG. NO.			16. NO. OF PERSONS ON BOARD
17. GRADE OF AIRCRAFT		18. PILOT GRADE			

FAA Form 500 5-64

**CLOSE FLIGHT PLAN UPON ARRIVAL**

7-64 66-50-11-01 66-50-11-01 17-64

**NOTE.**—Although FAR 91.83 does not require the information in item 16 for domestic flight, nor that in item 17 for any flight, pilots are urged to furnish this information to assist search and rescue if SAR action is required.

## 2. DVFR (DEFENSE VFR FLIGHT PLAN)

Detailed ADIZ procedures are found under GENERAL, page II-31.

### 3. COMPOSITE FLIGHT PLAN (VFR & IFR)

**a. Flight plans which specify VFR operation for one portion of a flight, and IFR for another portion, will be accepted at the point of departure. If VFR flight is proposed for the first portion of the flight, the pilot should request IFR clearance from (1) the FSS nearest the location at which change from VFR to IFR is proposed; or if unable to contact the FSS, (2) any air traffic control facility. In either case, if a *VFR flight plan* was filed for first portion of flight the pilot is responsible for notifying the FSS or air traffic control facility contacted to "CLOSE**



**FLIGHT PLAN—VFR (Con't)**

**VFR FLIGHT PLAN.** The pilot must remain in VFR weather conditions until operating in accordance with the IFR clearance.

b. When a flight plan indicates IFR for the first portion of flight and VFR for the latter portion, the pilot will normally be cleared to the point at which the change is proposed. Once the pilot has reported over the clearance limit and does not desire further IFR clearance, he should advise Air Traffic Control to cancel the IFR portion of his flight plan. Further clearance will not be necessary for VFR flight beyond that point. If the pilot desires to continue his IFR flight plan beyond the clearance limit, he should contact Air Traffic Control at least five minutes prior to the clearance limit and request further IFR clearance. If the requested clearance is not received prior to reaching the clearance limit fix, the pilot will be expected to establish himself in a standard holding pattern on the radial/course to the fix.

**4. CLOSING (F.A.R., PART 91.83(a))**

VFR and DVFR flight plans must be closed (canceled), or an arrival report filed, within 30 minutes (15 minutes for jets) after the estimated time of arrival. To do this, merely notify the nearest Flight Service Station or air traffic control facility by radio or telephone. If a report is not received within this time, a communications search will be conducted by the FAA facilities along your route. If this search fails to locate your aircraft, a Rescue Coordination Center will be advised and an extensive, costly physical search for your aircraft will be initiated.

**5. FLIGHT FOLLOWING FLIGHT PLAN (FVFR)**

FVFR service is available through flight service stations under the following conditions:

a. When requested by the pilot and when, in his judgment, the expected flight conditions will make FVFR service useful. This service is optional with the pilot and does not relieve him of his basic responsibility for the safe conduct of the flight.

b. The aircraft is equipped with functioning two-way radio compatible with the communication outlets to be used.

c. The flight route and proposed cruising altitudes are such that communications can be established with the flight watch stations over the designated flight watch points.

d. The "off-time" is reported to the departure station. Give the "off-time" direct to the station (preferred), tower, airport manager, or other reliable source.

e. The pilot agrees to contact the designated flight watch stations when over or passing the designated flight watch points.

**FLIGHT PLAN—IFR****1. GENERAL**

● a. Prior to departure from within, or prior to entering a control area or control zone, a pilot must submit a complete flight plan and receive an air traffic clearance, if weather conditions are below VFR minimums. Instrument flight plans may be submitted to the nearest Flight Service Stations or airport traffic control tower either in person or by telephone (or by radio if no other means are available). Pilots should file IFR flight plans at least 30 minutes prior to estimated time of departure to preclude possible delay in receiving a departure clearance from ATC.

b. When filing an IFR flight plan for flight in an aircraft equipped with a radar beacon transponder (no code, 64 code, or 4096 code), DME equipment, or a combination of both, identify equipment capability by adding a suffix to the AIRCRAFT TYPE preceded by a slant, as follows:

- /X (Transponder, no code)
- /T (Transponder, with 64 code capability)
- /U (Transponder, with 4096 code capability)
- /D (DME)
- /L (DME and transponder, no code)
- /B (DME and transponder, with 64 code capability)
- /A (DME and transponder with 4096 code capability)

**NOTE.**—The suffix is not to be added to the aircraft identification or be transmitted by radio as part of the aircraft identification.

c. If TACAN only equipped, include "TACAN only" in the remarks section of the flight plan.

● d. Aircraft are equipped with two basic types of airborne transponders having different select code (4096 or 64) capability on Mode A/3. The 64 select code transponder transmits only the two front digits of the 4096 code scale; e.g., 11 of 1100, 21 of 2132, 31 of 3100, etc. For ATC to utilize one or a combination of the 4096 discrete codes including the 64 basic select codes, **FOUR DIGIT CODE DESIGNATION** will be used, e.g., code 2100 will be expressed as **TWO ONE ZERO ZERO**.

**NOTE.**—Pilots of a 64 select code transponder equipped aircraft should disregard the last two numerals of the numbered code issued by ATC, e.g., if assigned code 2100 set in numerals 21.

**2. AIRWAYS/JET ROUTES**

a. It is vitally important that the route of flight be accurately determined and described in the flight plan to permit accurate plotting and planning by air traffic control. The issuance of air traffic control clearances governing IFR flight within controlled airspace will be predicated on pilot conformance with applicable Federal Aviation Regulations and adherence to route procedures. To simplify definition of route and to facilitate air traffic control, pilots are requested to file flight plans via **VOR Airways** or **Jet Routes** established for use at the altitude/flight level planned.

(1) If flight is to be conducted via the designated airways or jet routes, the route may be described by indicating the type and number of the airway(s) or jet route(s) requested. Federal airways or jet routes, whichever is appropriate, which cross or merge for short distances with the airway or jet route requested should not be indicated.

**Example 1:**

7000 MSP PRESCOTT V97 LAKEWOOD ORD

**Spelled Out:** Requesting 7000 feet from Minneapolis St. Paul International, via Prescott Intersection, Victor 97 to Lakewood Intersection, direct Chicago O'Hare International.

**Example 2:**

FL250 MSP J30 J16 ORD

**Spelled Out:** Requesting Flight Level 250 Minneapolis St. Paul International, Jet Route 30, Jet Route 16, to Chicago O'Hare International.

(2) The route of flight may also be described by



**FLIGHT PLAN—IFR (Con't)**

naming the reporting points over which the flight will pass, provided the points named are established for use at the altitude/flight level planned (see **DIRECT FLIGHTS** below).

**Example:**

3000 DCA RVD BAL

**Spelled Out:** Requesting 3000 feet from Washington National, via direct Riverdale direct Baltimore Friendship International.

(3) When the route of flight is defined by named reporting points, whether alone or in combination with airways or jet routes, and the navigational aids (VOR, VORTAC, TACAN, LF, RBN) to be used for the flight are a combination of different types of aids, enough information should be included to clearly indicate the route requested.

**Example:**

FL 310 LAX J5 LKV J3 GEG QE FL 330 HL500 LR HL515 WG

**Spelled Out:** Requesting Flight Level 310 from Los Angeles International via Jet Route 5 Lakeway, Jet Route 3 Spokane, direct Kimberly, British Columbia Low Frequency Range, Flight Level 330 High Level Airway 500 to Langruth, Manitoba VOR, High Level Airway 515 to Winnipeg, Manitoba.

(4) When filing IFR, it is to the pilots' advantage to file a "preferred route."

**3. DIRECT FLIGHTS**

a. All or any portions of the route which will not be flown on the radials/courses of established airways or routes, e.g., direct route flights, must be defined by indicating the radio fixes over which the flight will pass. Fixes selected to define the route shall be those over which the position of the aircraft can be accurately determined. Such fixes automatically become compulsory reporting points for the flight, unless advised otherwise by ATC. Only those navigational aids established for use in a particular structure, i.e., in the Low or High structures, may be used to define the en route phase of a direct flight within that structure.

b. The azimuth feature of VOR aids and the azimuth and distance (DME) features of VORTAC/TACAN aids are assigned certain frequency protected areas of airspace which are intended for application to established airway and route use, and to provide guidance for planning flights outside of established airways or routes. These areas of airspace are expressed in terms of cylindrical service volumes of specified dimensions called "class limits" or "categories." An operational service volume has been established for each class in which adequate signal coverage and frequency protection can be assured. To facilitate use of VOR, VORTAC or TACAN aids, consistent with their operational service volume limits, pilot use of such aids for defining a direct route of flight in controlled airspace should not exceed the following:

(1) Operations above Flight Level 450—use aids not more than 200 nautical miles apart. These aids are depicted on the Coast and Geodetic Survey Flight Information Publication En Route High Altitude Chart—U.S.

(2) Operation off established routes from 18,000 feet M.S.L. to Flight Level 450—use aids not more than 200

nautical miles apart. These aids are depicted on the Coast and Geodetic Survey, Flight Information Publication, En Route High Altitude Chart—U.S.

(3) Operation off established airways below 18,000 feet M.S.L.—use aids not more than 80 nautical miles apart. These aids are depicted on the Coast and Geodetic Survey, Flight Information Publication, En Route, Low Altitude Chart—U.S.

c. Airway or jet route numbers, appropriate to the stratum in which operation will be conducted, may also be included to describe portions of the route to be flown.

**Example:**

140 MDW V6 V10 BRL STJ SLN GCK

**Spelled Out:** Requesting 14,000 feet Chicago Midway Airport Victor 6, Victor 10, Burlington, Iowa, direct St. Joseph, Missouri, direct Salina, Kansas, direct Garden City, Kansas.

**NOTE:**—When route of flight is described by radio fixes, the pilot will be expected to fly a direct course between the points named.

**4. VFR OPERATIONS ON AN IFR FLIGHT PLAN (Ref. FAA EXAM—O—GRAM No. 6)**

a. In preparation for IFR flight above an overcast or in an area of generally unlimited ceilings and visibility, pilots may request "VFR CONDITIONS ON TOP" to permit them to select an altitude, or altitudes of their choice, rather than specific ATC assigned altitudes.

b. Departing instrument-rated pilots who wish an IFR clearance only to climb through a layer of overcast or reduced visibility, and then continue flight VFR may request ATC clearance "TO VFR CONDITIONS ON TOP". This request may be made through a Flight Service Station, by telephone to ATC, or by request to the Tower before taxiing out. The clearance, which authorizes IFR flight through the cloud layer, will contain a near-by clearance limit, routing, and a request to report reaching "VFR CONDITIONS ON TOP". When the pilot reaches "VFR CONDITIONS ON TOP" and desires to cancel the IFR portion of his flight, he should so state. This type of operation can be combined with a VFR Flight Plan to destination.

c. No separation is provided. However, the pilot may expect to receive traffic information on known IFR traffic. Any time a pilot is flying "in the clear," whether at a specific assigned altitude or at an altitude assignment of "VFR CONDITIONS ON TOP", collision avoidance is the pilot's responsibility. The pilot is expected to adhere to the proper altitude for the direction of flight and to keep ATC advised of his altitude.

d. Remember that when flying on an IFR clearance with a VFR restriction, a pilot must comply with Instrument Flight Rules plus applicable Visual Flight Rules.

**5. CANCELLING**

a. IFR flight plans may be canceled any time by so notifying Air Traffic Control, provided the flight is operating in VFR weather conditions when such action is taken. Where conditions indicate that the remainder of the flight can be conducted in accordance with VFR, a pilot may avail himself of this procedure to remove any Air Traffic Control restrictions which may have been issued affecting his flight.

b. An IFR flight plan may be cancelled by delivering the following message to the controller or the air/ground station with which the flight is in communication: "CAN-

**CEL MY IFR FLIGHT PLAN."** Since Air Traffic Control cannot approve or disapprove cancellation of the IFR flight plan, an acknowledgement that the message has been received is all that is required. If a flight plan has been cancelled and subsequent IFR operation becomes

necessary, a new IFR flight plan must be filed and a traffic clearance received before encountering IFR weather conditions.

**NOTE.—**Where a DVFR flight plan requirement exists it will be the responsibility of the pilot to file this flight plan to replace the cancelled IFR flight plan.



## DEPARTURE

### COMMUNICATIONS

1. Pilots of departing aircraft should communicate with the control tower on the appropriate ground control frequency for taxi and clearance information and, unless otherwise advised, should remain on that frequency until they are ready to request take-off clearance. At that time, the pilot should communicate with the tower on the appropriate local control frequency.

2. The airport ground control frequencies 121.7 and 121.9 mc are normally provided to eliminate frequency congestion on the tower (local control) frequency. Provision of these frequencies for ground control and their use by aircraft and airport utility vehicles operated on the surface of the airport thus provides a clear VHF channel for arriving and departing aircraft. They are used for issuance of taxi information, clearances, and other necessary contacts between the tower and aircraft or other vehicles operated on the airport. Normally, only one of these ground control frequencies is assigned for use at an airport; however, at locations where the amount of traffic so warrants, both frequencies may be assigned with one or the other designated as a clearance delivery frequency.

3. Pilots of aircraft not equipped to transmit on a ground control frequency should transmit on the tower frequency and tune their receivers to the appropriate ground control frequency in accordance with the above.

**NOTE.**—See Airport Advisory Service (Non-Radar), under **ARRIVAL**, for communications procedures at airports not served by control towers.

### LIGHT SIGNALS

1. The following procedures are used by airport traffic control towers in the control of aircraft not equipped with radio. These same procedures will be used to control aircraft equipped with radio if radio contact cannot be established. Airport traffic control personnel use a directive traffic control signal which emits an intense narrow beam of a selected color (either red, white, or green) when controlling traffic by light signals. Although the traffic signal light offers the advantage that some control may be exercised over non-radio equipped aircraft, pilots should be cognizant of the disadvantages which are:

a. The pilot may not be looking at the control tower at the time a signal is directed toward him.

b. The directions transmitted by a light signal are very limited since only approval or disapproval of a pilot's anticipated actions may be transmitted. No supplement or explanatory information may be transmitted except by the use of the "General Warning Signal" which advises the pilot to be on the alert.

### 2. Portable traffic control light signals:

Color and Type of Signal	On the Ground	In Flight
STEADY GREEN	Cleared for take-off	Cleared to land
FLASHING GREEN	Cleared to taxi	Return for landing (to be followed by steady green at proper time)
STEADY RED	Stop	Give way to other aircraft and continue circling
FLASHING RED	Taxi clear of landing area (runway) in use	Airport unsafe—do not land
FLASHING WHITE	Return to starting point on airport	
ALTERNATING RED & GREEN	General Warning Signal—Exercise Extreme Caution	

3. Between sunset and sunrise, a pilot wishing to attract the attention of the air traffic control tower operator should turn on a landing light and taxi the aircraft in position so that light is visible to the tower operator. The landing light should remain on until appropriate signals are received from the tower.

4. Pilots should acknowledge light signals by moving the ailerons or rudder during the hours of daylight or by blinking the landing or navigation lights during the hours of darkness.

5. During the hours of daylight the lighting of the rotating beacon will mean that ground visibility is less than three miles and/or that the ceiling is less than 1000 feet. During the hours of darkness, flashing lights outlining the traffic direction indicator (tetrahedron, wind tee or other device) will mean that ground visibility is less than three miles and/or the ceiling is below 1000 feet. The lighting of either of these signals indicates that a clearance from Air Traffic Control is necessary for landing, take-off, or flight in the traffic pattern if the airport is within a control zone.



## CLEARANCE

**NOTE.**—Refer to Airport Advisory Service (Nonradar), under ARRIVAL, for additional "clearance" information.

### 1. TAXI

a. A clearance must be obtained prior to taxiing on a runway, taking off or landing during the hours an airport traffic control tower is in operation. Authorization to taxi "to" a runway is authorization to cross runways that intersect the taxi route unless instructions to the contrary are received. Authorization to taxi "to" a runway does not constitute a clearance to taxi "on" that runway.

b. At those airports where the United States Government operates the control tower and ATC has authorized non-compliance with the requirement for two-way radio communications while operating within the airport traffic area, or at those airports where the United States Government does not operate the control tower and radio communications cannot be established, pilots shall obtain a clearance by visual light signal prior to taxiing on a runway and prior to take-off and landing. The following phraseologies and procedures are used in radio-telephone communications with aeronautical ground stations.

c. Aircraft identification, location, type of operation planned (VFR or IFR) and the point of first intended landing.

#### Example:

**Aircraft:** "WASHINGTON GROUND CONTROL, THIS IS BEECHCRAFT ONE THREE ONE FIVE NINER AT HANGAR EIGHT, READY TO TAXI, INSTRUMENT FLIGHT TO CHICAGO, OVER"

**Tower:** "BEECHCRAFT ONE THREE ONE FIVE NINER, RUNWAY THREE SIX, WIND ZERO THREE ZERO DEGREES AT TWO FIVE, ALTITUDE THREE ZERO ZERO FOUR, TIME ONE FOUR TWO SIX GREENWICH, ZERO NINER TWO SIX EASTERN. TAXI SOUTH HOLD SHORT OF RUNWAY THREE." (Runways are numbered to correspond to their magnetic bearing. Runway 27, for example, has a bearing of 270°. Wind directions issued by control towers are also magnetic.) Air route traffic control clearances are relayed to pilots by airport traffic controllers in the following manner:

#### Example:

**Tower:** "ATC CLEARS BEECHCRAFT ONE THREE ONE FIVE NINER TO THE CHICAGO MIDWAY AIRPORT, VIA VICTOR EIGHT, MAINTAIN EIGHT THOUSAND, OVER."

**Aircraft:** "BEECHCRAFT ONE THREE ONE FIVE NINER IS CLEARED TO THE CHICAGO MIDWAY AIRPORT, VIA VICTOR EIGHT, MAINTAIN EIGHT THOUSAND, OVER."

**NOTE.**—Normally, an ATC IFR clearance is relayed to a pilot by the ground controller. At busy locations, however, pilots may be instructed by the ground controller to "CONTACT CLEARANCE DELIVERY" on a frequency designated for this purpose. No surveillance or control over the movement of traffic is exercised by this position of operation.

### 2. TAKEOFF

#### a. Withholding Take-Off Clearance

(1) Take-off clearance will be denied to the pilot of any air carrier or commercial aircraft carrying passengers or property for compensation or hire whenever:

(a) The runway visual range (RVR) for the departure runway is less than 2000 feet and the prevailing visibility is less than one-fourth statute mile at locations with RVR meters or where the RVR is less than 1600 feet at those locations which have RVR digital displays.

(b) If RVR is not available, runway visibility for the departure runway is less than one quarter of a mile; or

(c) If neither RVR nor reported runway visibility is available, the prevailing visibility for the airport of departure is less than one quarter of a mile.

(2) If, upon being refused a take-off clearance, a pilot of an aircraft in the above category advises he is not carrying passengers or property for compensation or hire, for example, a business aircraft carrying company employees or an air carrier aircraft on a ferrying or training flight, take-off clearance may be authorized based on traffic conditions.

#### b. Air Traffic Clearance/Instruction

(1) When air traffic control issues a clearance, pilots are expected to execute its provision after acceptance. Any clearance in which the time of pilot execution is optional will so state—"At pilot discretion."

(2) When air traffic control issues an instruction, pilots are expected to comply with its provision upon receipt. ATC, in certain situations, will include the word "IMMEDIATELY" in an instruction to impress urgency of an imminent situation and expeditious compliance by the pilot is expected and necessary for safety.

(3) Traffic clearances will only provide standard separation between IFR flights. *During the time an IFR flight is operating in VFR weather conditions, it is the direct responsibility of the pilot to avoid other aircraft, since VFR flights may be operating in the same area without the knowledge of ATC.*

(4) Air Traffic Control will not issue clearances specifying that climb or descent or any portion of the flight be conducted in "VFR conditions," to any IFR flight, regardless of altitude, except under emergency situations, or unless specifically requested by the pilot. When a VFR restriction is issued at the pilot's request, general traffic information will be issued to the pilot of an aircraft operating with a clearance specifying a "VFR conditions" restriction for climb or descent.

(5) A traffic clearance originated by an ARTC Center and relayed to the pilot through a control or air/ground communication station will be prefixed by "ATC CLEARS." Other ATC messages which are originated by a center will be prefixed with "ATC REQUESTS" or "ATC ADVISES."

(6) The traffic clearance issued prior to departure will normally authorize flight to the airport of intended landing. Under certain conditions, at some locations a short range clearance procedure is utilized whereby a clearance is issued to a fix within or just outside of the terminal area and the pilot is advised of the frequency on which he will receive the long range clearance direct from the center controller.

(7) ATC facilities will use the phrase "VIA FLIGHT PLANNED ROUTE" in air traffic clearances to replace the lengthier detailed description of any portion of the route of flight that is identical to the route filed by the pilot. When used, the phrase will be preceded by sufficient detailed route of flight information to establish



**CLEARANCE (Con't)**

the flight on the filed route. The *"VIA FLIGHT PLANNED ROUTE"* phraseology does not include approval of altitudes filed in the flight plan. Specific altitude assignments will be issued in each clearance. Approval of any change of altitude, whether such altitude is contained in the flight plan or is subsequently desired en route, should be requested prior to reaching the point at which it is desired to make the change. IFR flight plans filed by the pilots should contain the complete route of flight and should be relayed to Air Traffic Control unchanged. Pilots may request route verification when considered necessary and are requested to do so whenever a filed route has been changed prior to departure. If route verification is desired prior to departure, the request should be included with initial call for taxi clearance to avoid delay in receiving the information.

(8) Amendments to the initial clearance will be issued at any time an air traffic controller deems such action necessary to avoid possible conflict between aircraft. Clearances will require that a flight "hold" or change altitude prior to reaching the point where standard separation from other IFR traffic would no longer exist. Some pilots have questioned this action and requested "traffic information" and were at a loss when the reply indicated "no traffic reported." In such cases the controller has taken action to prevent a traffic conflict which would have occurred at a distant point.

(9) A pilot may wish an explanation of the handling of his flight at the time of occurrence; however, controllers are not able to take time from their immediate control duties nor can they afford to overload the ATC communications channels to furnish explanations. Pilots may obtain an explanation by directing a letter or telephone call to the chief controller of the facility involved.

(10) Clearances are normally issued for the altitude/flight level and route filed by the pilot. However, due to traffic conditions, it is frequently necessary for ATC to specify an altitude/flight level or route different from that requested by the pilot. In addition, flow patterns have been established in certain congested areas, or between congested areas, whereby traffic capacity is increased by routing all traffic on preferred routes. Information on these flow patterns is available in offices where pre-flight briefing is furnished or where flight plans are accepted.

(11) The pilot has the privilege of requesting a different clearance from that which has been issued by ATC if he feels that he has information which would make another course of action more practicable or if aircraft equipment limitations or company procedures forbid compliance with the clearance issued.

(12) Whenever an aircraft has been cleared to a point other than the destination airport, it is the responsibility of the ATC controller to furnish the pilot (or the air/ground communications facility concerned) with an additional clearance prior to the time the flight arrives at the clearance limit. This clearance may authorize flight beyond the clearance limit or contain holding instructions for the flight. However, when such clearance is not received by the time a flight is three minutes from the clearance limit the pilot is expected to effect speed reduction so as to cross the clearance limit initially at or be-

low maximum holding speed (unless subsequent clearance prior to reaching the clearance limit permits flight beyond it); and when reaching the clearance limit, begin holding in a STANDARD HOLDING PATTERN ON THE COURSE ON WHICH HE APPROACHES THE FIX (disregarding any other pattern shown for the fix), maintaining the last assigned altitude/flight level and immediately request further clearance through the air/ground station. The altitude/flight level of the aircraft at this clearance limit will be protected so that separation will exist in the event the aircraft holds awaiting further clearance.

**NOTE.**—The foregoing should not be construed as being related in any way to the procedures which apply when a two-way radio failure occurs.

(13) Pilots should pay particular attention to the clearance and not assume that the route and altitude/flight level are the same as requested in the flight plan. It is suggested that pilots make a written record of clearances at the time they are received, and verify, by a repeat back, any portions that are complex or about which a doubt exists.

**c. Special VFR Flight Clearance Procedures (F.A.R. Part 91.107)**

(1) An Air Traffic Control clearance is necessary to avoid collision when operating under special VFR weather minimums in a control zone. When a control tower is located within the control zone, a clearance must be obtained from the tower before entering the control zone. If no control tower is located within the control zone, a clearance must be obtained from the nearest tower, center, or Flight Service Station, prior to entering the control zone. In this instance, clearance arrangements can be made by telephone.

(2) It is not necessary to file a complete flight plan with the request for clearance but the pilot should state his intentions in sufficient detail to permit air traffic control to fit his flight into the traffic flow. The clearance will not contain a specific altitude as the pilot must remain clear of clouds. The controller may require the pilot to fly at or below a certain altitude due to other traffic, but the altitude specified will permit flight at or above the minimum safe altitude. In addition, at radar locations, flights may be vectored if necessary for control purposes or on pilot request.

**3. STANDARD INSTRUMENT DEPARTURES (SIDS)**

**a.** A Standard Instrument Departure (SID) is an air traffic control coded departure routing which has been established at certain airports to simplify clearance delivery procedures.

**b.** Pilots of air carrier or military aircraft operating under Instrument Flight Rules (IFR) at airports for which SIDs have been published may be issued clearances whenever ATC determines it is appropriate.

**c.** Pilots of other than air carrier or military aircraft operating under Instrument Flight Rules (IFR) at airports for which SIDs have been published will not be issued a SID clearance by ATC unless requested by the pilot.

**d.** It will be the responsibility of each pilot to accept or refuse the clearance issued.

**e.** SIDs are published by the Coast & Geodetic Survey as a part of the Flight Information Publication package.



**CLEARANCE (Con't)****4. ADHERENCE TO AIR TRAFFIC CLEARANCE**

a. When air traffic clearance has been obtained under either the Visual or Instrument Flight Rules, the pilot in command of the aircraft shall not deviate from the provisions thereof unless an amended clearance is obtained. The addition of a VFR or other restriction, i.e., climb/descent point or time, crossing altitude etc., does not authorize a pilot to deviate from the route of flight or any other provision of the air traffic control clearance.

b. The most important and guiding principal to remember is that the last ATC clearance has precedence over related portions of the previous ATC clearance. A clearance which amends an altitude of a previous clearance does not affect route of flight nor does a clearance which amends the route of flight affect the altitude portion of a previous clearance.

**Example:** A departure flight receives a clearance to destination airport to maintain Flight Level 200. The clearance incorporates a SID which has certain altitude crossing instructions. Shortly after take-off, the pilot receives a new clearance changing the maintaining Flight Level from 200 to 250. In this instance, altitude restrictions are automatically canceled and the pilot should commence an unrestricted climb to Flight Level 250. If the controller had wished to retain the altitude restrictions, he would have either restated them or made it clear in the language of the clearance that only the final maintaining level was being changed.

c. In case emergency authority is used to deviate from provisions of an ATC clearance the pilot in command shall notify ATC as soon as possible and obtain an amended clearance. In an emergency situation which results in no deviation from the Rules prescribed in Part 91 but which requires air traffic control to give priority to an aircraft, the pilot of such aircraft shall make a report within 48 hours of such emergency situation to the nearest FAA Regional Office.

d. In addition to altitude/flight level destination and/or route changes, increasing or decreasing the speed of an aircraft constitutes a change in a flight plan. Therefore, at any time the average true airspeed at cruising altitude between reporting points varies or is expected to vary from that given in the flight plan by *plus or minus ten knots*, air traffic control should be advised.

e. Air traffic clearances include data to assist pilots in identifying radio reporting points for where there is more than one type with the same name, for example: "Denver VOR." It is the responsibility of a pilot to notify air traffic control immediately if his radio equipment cannot receive the type of signals he must utilize to comply with his clearance.

f. The altitude/flight level instructions in an ATC clearance normally require that a pilot "MAINTAIN" the altitude/flight level at which the flight will operate

when in controlled airspace. Altitude/flight level changes while en route should be requested prior to the time the change is desired.

g. The term "CRUISE" may be used instead of "MAINTAIN" to signify to the pilot that descent from cruising altitude may be commenced at his discretion without further clearance from ATC. "CRUISE" is normally used only for relatively short flights in uncongested areas and is authorization for the flight to proceed to, and make an approach at, destination.

**5. SEPARATION STANDARDS**

a. Air traffic control effects separation of aircraft vertically by assigning different altitudes; longitudinally by providing a minimum time separation between aircraft on the same courses; and laterally by assigning different flight paths.

b. Standard separation will be provided between all aircraft operating on IFR flight plans except: (1) when "VFR" Conditions-On-Top" has been requested by a pilot and authorized by ATC in lieu of a specific cruising or holding altitude, and (2) when clearances specifying that climb or descent or any portion of the flight shall be conducted in "VFR Conditions" are issued.

**DEPARTURE CONTROL**

1. Departure Control is a tower-function responsible for ensuring separation between departures. So as to expedite the handling of departures, Departure Control may suggest a take-off direction other than that which may normally have been used under VFR handling. Many times it is preferred to offer the pilot a runway that will require the fewest turns after take-off to place the pilot on his filed course or selected departure route as quickly as possible. At many locations particular attention is paid to the use of preferential runways for local noise abatement programs, and route departures away from congested areas.

2. Departure Control utilizing radar will normally clear aircraft out of the terminal area using standard instrument departures via radio navigation aids. When a departure is to be vectored immediately following take-off, the pilot will be advised prior to take-off of the initial heading to be flown. When given a vector taking his aircraft off a previously assigned nonradar route, the pilot will be advised briefly what the vector is to achieve. Thereafter, radar service will be provided until the aircraft has been re-established "on-course" using an appropriate navigation aid and the pilot has been advised of his position; or, a handoff is made to another radar controller with further surveillance capabilities.

3. Controllers will inform pilots of the departure control frequencies and, if appropriate, the transponder code before take-off. Pilots should not operate their transponder until ready to start the take-off roll or change to the departure control frequency until requested.



## ENROUTE

### AIRWAYS/ROUTE SYSTEMS

1. Two route systems have been established for air navigational purposes in the contiguous 48 states; the VOR and L/MF System and the Jet Route System.

a. The VOR and L/MF Airway System consists of airways designated from 700 feet above the surface (or in some instances higher) to but not including 18,000 feet MSL and is designed to serve aircraft which operate at these altitudes. These airways are depicted on Coast and Geodetic Survey, Flight Information Publications, En Route Low Altitude Charts—U.S. Series L-1 through L-28.

(1) The VOR airways are predicated solely on VOR/VORTAC navigation aids and are depicted on aeronautical charts by a "V" ("Victor") followed by the airway number, e.g., V 12. These airways are numbered similarly to U.S. highways. As in the highway numbering system, a segment of an airway which is common to two or more routes carries the numbers of all the airways which coincide for that segment. When such is the case a pilot in filing a flight plan needs to indicate only that airway number of the route which he is using. *Alternate Airways* are identified by their location with respect to the associated main airway. "Victor 9 West" indicates an alternate airway associated with, and lying to the west of Victor 9. As in the interstate highway system, major metropolitan areas, in many instances, are connected by *preferred routes* of flight which may include many numbered airway segments. To facilitate flight planning and to reduce phraseology, these preferred routes are assigned an 800 series airway number. Accordingly, a pilot in filing a flight plan need only to indicate the 800 series airway number assigned to the route he is using.

(2) One of the major reasons for establishing a VOR airway system separate from the colored airway system (L/MF) is to facilitate route identification in flight plans and air traffic clearances. A pilot who intends to make an airway flight, using VOR facilities, will simply specify the appropriate "Victor" airway(s) in his flight plan. For example, if a flight is to be made from Chicago to New Orleans at 8000 feet, using omniranges only, the route may be indicated as "Departing from Chicago-Midway, cruising 8000 feet via Victor 9 to Molsant International." If flight is to be conducted in part by means of L/MF navigation aids and in part on omniranges, specifications of the appropriate colored airways and Victor airways in the flight plan will indicate which types of facilities will be used along the described routes, and, for IFR flight, permit ATC to issue a traffic clearance accordingly. As an example, route information for a flight from Chicago to New Orleans using L/MF facilities to St. Louis and VOR's to New Orleans would be given as "Departing Chicago-Midway cruising 8000 feet via Red 14, Amber 5 to St. Louis Victor 9 to Molsant International." A route may also be described by specifying the station over which the flight will pass, but in this

case since many VOR's and L/MF aids have the same name, the pilot must be careful to indicate which aid will be used as a particular location. This will be indicated in the route of flight portion of the flight plan by specifying the type of facility to be used after the location name in the following manner: Newark L/MF, Allentown VOR.

● (3) With respect to position reporting, reporting points are designated for VOR Airway Systems. Flights using Victor Airways will report over these points unless advised otherwise by ATC.

(4) The L/MF airways are predicated solely on L/MF navigation aids and are depicted on aeronautical charts by color and number; e.g., Amber One. Green and Red airways are plotted east and west. Amber and Blue airways are plotted north and south. This obsolete system, which is incompatible with the VOR system, is almost entirely replaced by the VOR airway system.

b. The Jet Route System consists of jet routes established from 18,000 feet MSL to FL 450 inclusive designed to serve aircraft which customarily operate at these altitudes.

(1) Jet routes are based on VOR, VOR-DME and VORTAC facilities shown on high altitude charts. They are identified by the letter "J" followed by a number. This structure is depicted on Coast and Geodetic Survey Flight Information En Route High Altitude Charts—U.S. Series H-1 through H-4.

(2) Operation above FL 450 may be conducted on a point-to-point basis. Navigational guidance is provided on an area basis utilizing those facilities depicted on the Coast and Geodetic Survey, Flight Information Publication En Route High Altitude Charts—U.S. Series H-1 through H-4.

2. To the extent possible, these route systems have been aligned in an overlying manner to facilitate transition between each. To simplify definition of route and to facilitate air traffic control, pilots are requested to file via the airways/jet routes published for the altitude/flight level planned.

3. Pilots are cautioned when flying in Canadian airspace, to review Canadian Air Regulations. Special attention should be given to the parts which differ from U.S. Federal Aviation Regulations. For example, the Canadian airways "Block Airspace" restriction, which requires an ATC clearance when flying on airways between 9500' and 23,000' MSL east of longitude 114°W and between 12,500' and 23,000' MSL west of longitude 114°W. In addition, no person holding a commercial or private pilot license without an instrument rating shall operate an aircraft in VFR flight within block airspace unless he has successfully completed a written examination demonstrating his knowledge of radio navigation and of air traffic control procedures applicable to IFR flight including clearances and position reports and his license is endorsed to that effect by the Canadian Department of Transport.



## CONTINENTAL CONTROL AREA

1. The Continental Control Area consists of the airspace of the 48 contiguous states and the District of Columbia at and above 14,500 feet MSL, but does not include:

a. The airspace less than 1500 feet above the surface of the earth; or

b. Prohibited and restricted areas, other than restricted area military climb corridors and the restricted areas listed in Subpart D of Part 71 of the F.A.R.

2. To alleviate the risk of collision between the high performance aircraft using this airspace, VFR minimums have been increased to: visibility, 5 miles; distance from clouds, 1000 feet under, 1000 over, and one mile horizontally.

## POSITIVE CONTROL AREA

1. Airspace so designated wherein all aircraft are controlled. For operations within positive control areas, aircraft must be:

a. Operated under IFR at specified altitude assigned by ATC.

b. Equipped with instruments and equipment required for IFR operations and flown by a pilot rated for instrument flight;

c. Equipped with a coded radar beacon transponder, having a Mode A (military Mode 3) 64 code capability, replying to Mode 3/A interrogation with the code specified by ATC; and

d. Radio equipped to provide direct pilot/controller communication on the frequency specified by ATC for the area concerned.

2. ATC may authorize deviations from the above requirements for operation in a positive control area. In the case of in-flight failure of a radar beacon transponder, ATC may immediately approve operation within a positive control area. In all other cases, requests for an authorization to deviate must be submitted at least four days before the proposed operation, in writing, to the ARTC Center having jurisdiction over the positive control area concerned. ATC may authorize deviations on a continuing basis or for an individual flight, as appropriate.

## JET ADVISORY SERVICE

### 1. GENERAL

a. Jet Advisory Service has been established as a means of providing an increased degree of safety for civil air carrier turbojet and certain other civil flights. In radar jet advisory areas, this service is performed by selected radar equipped facilities and provides the pilots of civil air carrier turbojet and certain other civil flights with information intended to aid them to see and/or avoid other pertinent traffic. In nonradar jet advisory areas, civil air carrier turbojet and certain other civil flights receiving this service are afforded standard IFR separation from all other flights known by ATC to be operating within these areas. Although standard ATC separation is provided between aircraft receiving jet advisory service and all other aircraft within the nonradar jet advisory area, standard separation is not provided and may not exist between such aircraft and aircraft operating VFR or VFR conditions-on-top outside the area.

b. This service is provided to all civil air carrier turbojet flights. It is proffered by the appropriate ATC facility to other IFR civil flights, excluding those cleared to maintain "VFR conditions" or "VFR conditions-on-top," which are radar beacon equipped and cleared via jet routes along which jet advisory areas are prescribed; except that, jet advisory service is not provided to flights, other than civil air carrier turbojets, whose pilots have declined the service. Whenever workload will not permit provision of this service to all flights specified herein, it may be discontinued to flights other than civil air carrier turbojets. In such event, pilots of those flights affected will be so advised.

c. Except where positive control areas have been established, radar jet advisory areas consist of airspace so designated 14 nautical miles on either side of specified jet routes, and in certain control areas and control area extensions, between Flight Levels 240 and 410 inclusive. Due to limited vertical radar coverage, however, the lower limits may be established above the Flight Level 240 and therefore, may overlap nonradar jet advisory areas. When radar jet advisory areas are established above nonradar jet advisory areas, the nonradar jet advisory areas are limited to levels below the radar jet advisory areas.

### 2. DEFINITIONS

**Jet advisory service**—The service provided certain civil flights while operating within radar and nonradar jet advisory areas. Within radar jet advisory areas, civil flights receiving this service are provided radar flight following, radar traffic information and vectors around observed traffic. In nonradar jet advisory areas, civil flights receiving this service are afforded standard IFR separation from all other flights known to ATC to be operating within these areas.

**Radar flight following**—The radar tracking of identified aircraft targets and the observation of the progress of such flights sufficiently to perform a particular radar function.

**Radar traffic information**—Any aircraft observed on the radar scope which in the judgment of the controller appears to constitute a hazard to the operation of flight being provided jet advisory service.

**NOTE**—Radar jet advisory areas and nonradar jet advisory areas and the flight levels comprising these areas are depicted on En Route-High Altitude Charts, U.S.

### 3. JET ADVISORY AREA PROCEDURES

a. F.A.R. Part 91.99 requires an aircraft equipped with a functioning Mode 3/A radar beacon transponder, to operate the transponder on the code specified by ATC. This regulation imposes no additional operational restriction, control or communications requirements on non-air carrier civil or military VFR flights or IFR flights cleared to climb or descend in VFR conditions or cleared to maintain VFR conditions-on-top when operating within radar jet advisory areas.

(1) To comply with the transponder requirements, transponders shall be adjusted as outlined in "Air Traffic Control Radar Beacon System (ATCRBS)."

**NOTE**—Although charts may show radar jet advisory areas overlapping restricted airspace, pilots of aircraft conducting authorized operations within such airspace are not required to operate transponders during the time such airspace is being utilized for the purpose for which designated; however, operation of transponders as described above is



**JET ADVISORY SERVICE (Con't)**

encouraged. Flights authorized by the air traffic control facility (controlling agency) to operate through or within such airspace, or flights leaving such airspace to enter a radar jet advisory area are required to operate transponders as described above.

b. Pilots of aircraft not equipped with functioning coded beacon transponders desiring to operate within radar jet advisory areas when operating VFR, or IFR when cleared to climb or descend in VFR conditions or to maintain VFR conditions-on-top, must obtain specific authorization from the appropriate ARTC Center prior to the time of entering such areas. ATC clearances specifying climb or descent in VFR conditions or a cruising level of VFR conditions-on-top, but not including specific authorization to operate within or across radar jet advisory areas, do not constitute such approval.

c. In the event of two-way communications failure which precludes obtaining authorization to operate within a radar jet advisory area, the flight may:

(1) When IFR—operate within a radar jet advisory area provided a specific altitude has been assigned by ATC.

(2) When VFR—operate within a radar jet advisory area provided an appropriate VFR cruising flight level is maintained.

#### **4. SERVICE PROVIDED CIVIL AIR CARRIER TURBOJET AND CERTAIN OTHER CIVIL FLIGHTS WITHIN AREAS OF RADAR COVERAGE**

a. Civil air carrier turbojet and certain other civil flights, as described in Paragraph 1.b above, are provided service as follows:

(1) Within radar jet advisory areas, flights are radar flight followed and furnished traffic information and vectors, subject to limitations set forth below, to avoid traffic observed with radar.

(2) Within positive control airspace, jet advisory service is not provided and procedures prescribed for control of traffic within such airspace apply.

(3) Outside radar jet advisory areas and positive control airspace, IFR flights are radar flight followed and furnished radar traffic information at all altitudes and flight levels to the maximum extent practicable consistent with controller workload and limitations of the radar equipment.

b. Primary radar is utilized at all times, unless precipitation or electronic countermeasure interference or other conditions render it unusable. Radar beacon is utilized for identification, radar handoff and primary radar target reinforcement to the maximum extent practicable. In the event either the primary radar or the radar beacon system is unusable, service is continued with that system which is still usable, and pilots are advised accordingly.

**NOTE.**—Due to the fact that coverage patterns obtained from primary radar and radar beacon may not be the same in all areas, even though their antennas are co-located, it is possible that this service will be provided in areas from which only primary radar or radar beacon returns are being received. If both systems are operating normally the pilot will not be advised of these circumstances.

c. Radar handoff of flights receiving this service is effected at all times above Flight Level 240 within overlapping radar coverage, unless the controller is prevented from doing so by circumstances beyond his control.

Radar handoff of these flights below Flight Level 240 is effected to the extent permitted by equipment, trained personnel and traffic conditions.

d. Traffic information furnished flights receiving this service includes, to the extent practicable, information as to whether observed radar traffic is seen with radar beacon, and if the type aircraft is unknown, by the use of the words "fast" or "slow," advice on the relative speed of the observed radar traffic.

e. Whenever, in the opinion of the jet advisory controller, an observed primary radar or beacon aircraft target is on a course which is likely to cause it to merge with or touch the target of the flight receiving this service, that flight is vectored to avoid the observed traffic, insofar as possible, whether or not the pilot requests vectoring, except that:

(1) Whenever feasible, flights not receiving this service, but radar identified and in communication with the jet advisory controller, may be vectored to avoid the flight being provided the service.

(2) If the pilot of the flight being provided this service advises that he does not desire vectoring, the controller does not provide radar vectors but will continue to provide traffic information.

(3) If the pilot of the flight being provided this service advises that he has the potentially conflicting traffic in sight, radar vectors are not given.

(4) Flights receiving this service are not vectored to avoid nonbeacon targets which are judged by the controller to be slow moving, unless specifically requested by the pilot; however, traffic information regarding such flights is furnished.

(5) Flights receiving this service are not vectored to avoid other IFR flights that are in communication with the jet advisory controller; are radar identified; and are being afforded nonradar IFR separation from these flights. When such flights are operating at assigned flight levels which differ by 2,000 feet or less from the assigned flight level of the flight being provided this service and the radar flight paths of these aircraft are such that, in the opinion of the controller, a vector would be necessary if altitude separation did not exist, the controller will issue traffic information, including assigned flight levels, to both aircraft concerned.

(6) When a concentration of targets is observed by the jet advisory controller which precludes vectoring to avoid individual targets, pilots of flights receiving this service are advised of the traffic, and that vectors cannot be given from individual targets. They are also told the extent of vectoring that would be necessary to avoid the area in which said traffic exists. Should a pilot request to be vectored around that area, the request will be complied with, provided it is within usable radar coverage. Should he not request vectoring around the area, he will be advised when his aircraft is clear of the area and vectoring from individual targets is being resumed.

f. When a civil flight, as specified in Paragraph 1.b., is operating VFR in a terminal area, the terminal air traffic control facility provides radar traffic information or, in lieu thereof, visual surveillance and advice regarding traffic to the maximum extent practicable consistent with workload, traffic conditions, weather, etc. Insofar as is possible, radar surveillance is maintained until visual surveillance is established.



## JET ADVISORY SERVICE (Con't)

## 5. RADIO OR RADAR FAILURE PROCEDURES APPLICABLE TO FLIGHTS BEING PROVIDED RADAR JET ADVISORY SERVICE

a. In the event of a ground radar failure the pilot is expected to continue in accordance with his last received ATC clearance remaining on the radar facility's radio frequency until further advised. If the radar failure will be prolonged, the pilot may be advised to change to an appropriate ARTC Center frequency until radar service can be resumed.

b. In the event of loss of communication with the jet advisory controller on the last assigned control frequency, the pilot should attempt to re-establish communication with the controller as specified in "COMMUNICATIONS". If it has been determined that only the aircraft transmitting capabilities have failed, the pilot should be alert for advice on the last assigned control frequency or 121.5 mc to acknowledge instructions by actuating the radar beacon IDENT features or by executing specific code changes.

## 6. VFR FLIGHT REQUIREMENTS FOR NONRADAR JET ADVISORY AREAS

a. These areas consist of airspace prescribed from Flight Level 270 thru 310 inclusive, and from Flight Level 370 thru 410 inclusive, along segments of specified jet routes where radar traffic information cannot be provided due to lack of radar coverage. Their width is 14 nautical miles on either side of such jet routes as specified in Federal Aviation Regulations, Part 75.

b. Air Route Traffic Control Centers provide IFR separation between civil flights receiving this service and all other aircraft known to ATC operating within nonradar jet advisory areas, including VFR and IFR flights cleared to maintain VFR conditions-on-top or to climb or descend in VFR conditions, which are authorized to transit nonradar jet advisory areas. The following operational procedures apply to pilots of all aircraft operating VFR, as well as those cleared by ATC to climb or descend in VFR conditions or cleared to maintain VFR conditions-on-top which desire to fly across or within those areas designated as nonradar jet advisory areas.

(1) Specific authorization must be obtained from the appropriate ARTC Center prior to entering these designated areas. When an ATC clearance specifies climb or descent in VFR conditions or a cruising level of VFR conditions-on-top and does not include specific authorization to transit these areas, the pilot must obtain such authorization prior to entering a nonradar jet advisory area.

c. Request for specific authorization to proceed VFR or VFR conditions-on-top, across or within these areas must include a position report, type of aircraft and estimated time of entry and exit from these segments. Unrestricted authorization will be granted, except that when conflict with a civil flight receiving this service is indicated, aircraft operating VFR or IFR maintaining VFR conditions-on-top will be advised of the civil flight and said approval will restrict operation to specific flight level(s), time or locality, as appropriate, to preclude conflict with the civil flight.

d. No ATC separation is provided between VFR traffic or between VFR and IFR traffic other than civil flights receiving this service; however, traffic information is issued as appropriate.

7. The above procedures are applicable to those areas designated in Part 75 of Federal Aviation Regulations.

## HOLDING

1. When holding at a VOR station pilots should begin the turn to the outbound leg at the time of the first complete reversal of the "to-from" indicator.

2. The direction to hold with relation to the holding fix will be specified as one of eight general points of the compass; i.e., North, Northeast, East, etc.

3. Pilots are always expected to hold in a standard right turn pattern unless specifically advised otherwise by ATC. When it is necessary that a non-standard pattern be flown, the ATC clearance will specify "left turns."

4. ATC clearance requiring that an aircraft be held at a holding point will include the following information:

## a. General Holding Instructions.

(1) The direction to hold from holding point;

(2) Holding fix;

(3) On (specified) radial, course, magnetic bearing, airway number or jet route;

(4) Outbound leg length in nautical miles if DME is to be used;

(5) Left turns, if nonstandard pattern is to be used;

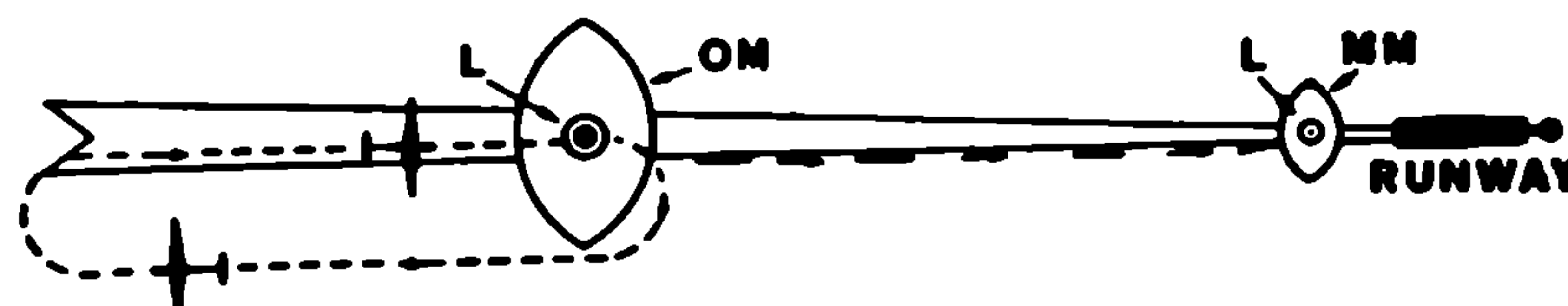
(6) Time to expect further clearance, or time to expect approach clearance.

b. Detailed holding instructions: Same as a (1), (2), and (3) above with following additions to (4) and (5):

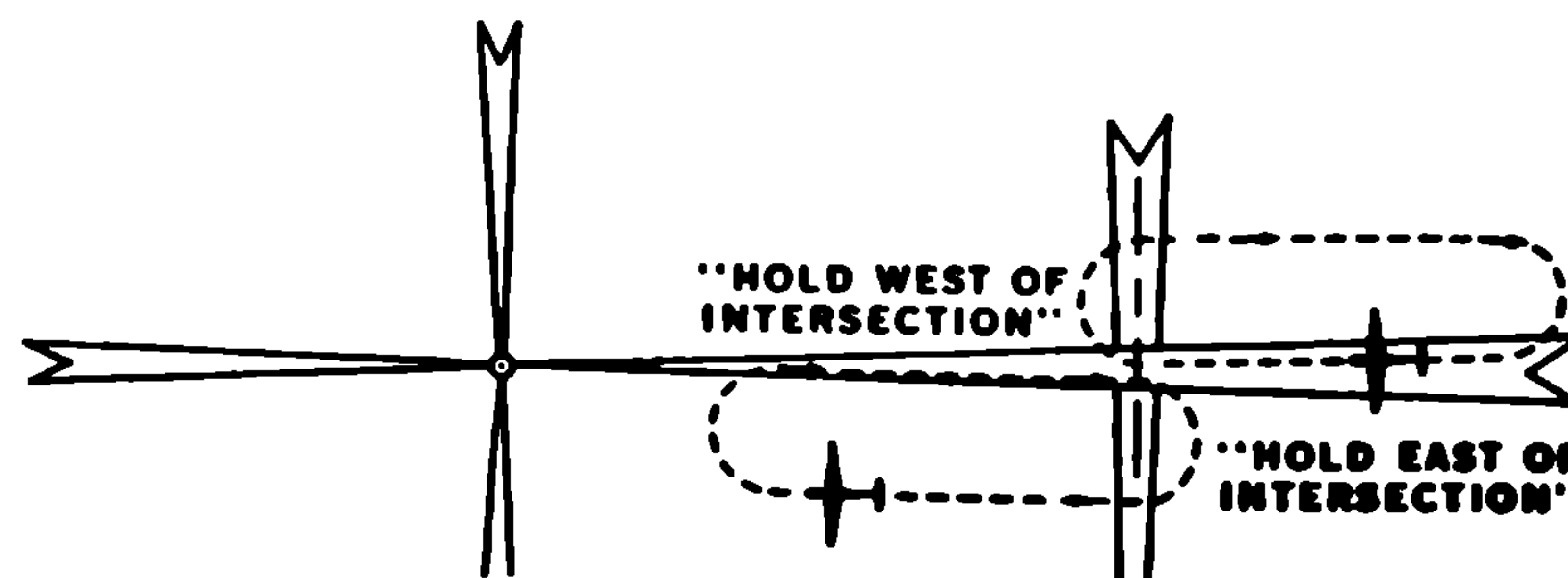
(4), or minute/s if DME is not to be used.

(5), or right turns if standard pattern is to be used.

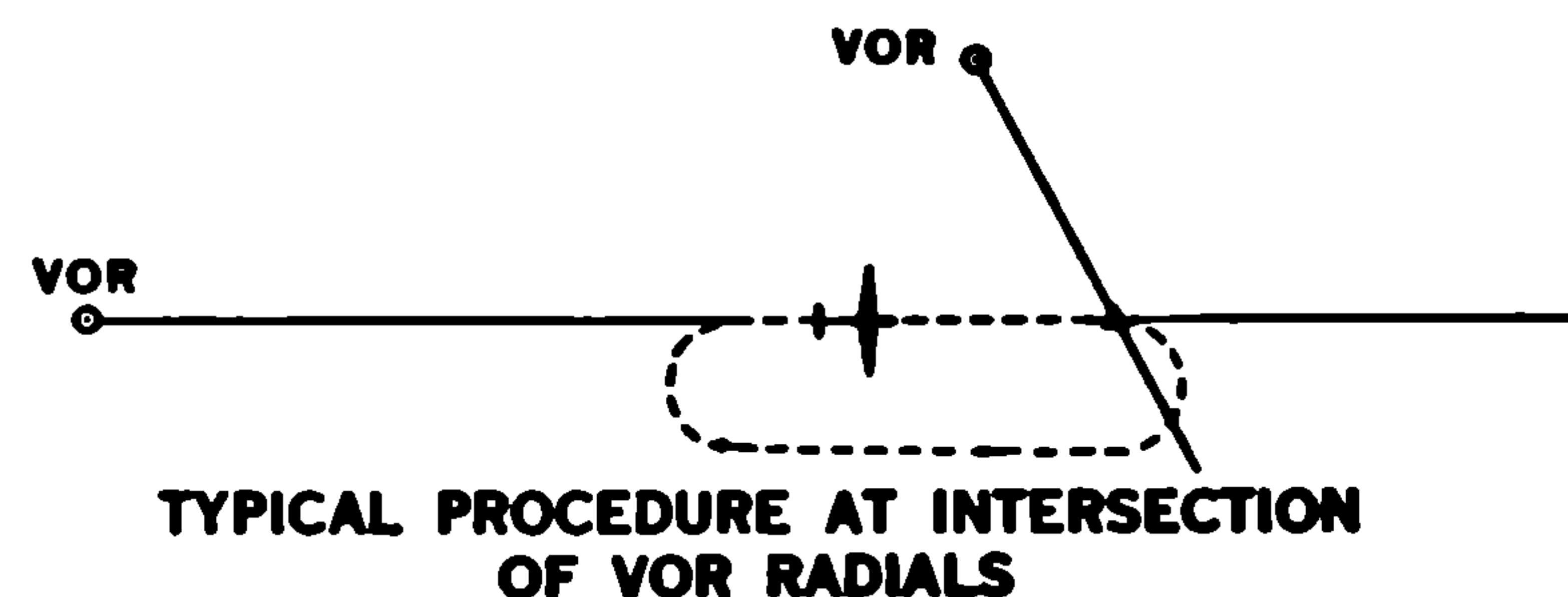
## EXAMPLES OF HOLDING



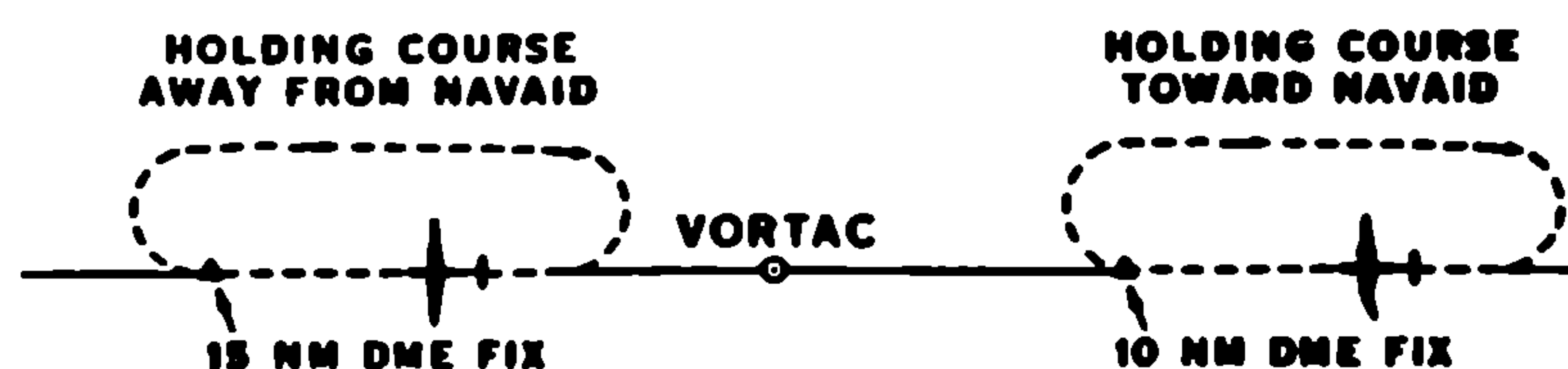
TYPICAL PROCEDURE ON AN ILS OUTER MARKER



TYPICAL PROCEDURE AT INTERSECTION OF RADIO RANGE COURSES



TYPICAL PROCEDURE AT INTERSECTION OF VOR RADIALS



TYPICAL PROCEDURE AT DME FIX

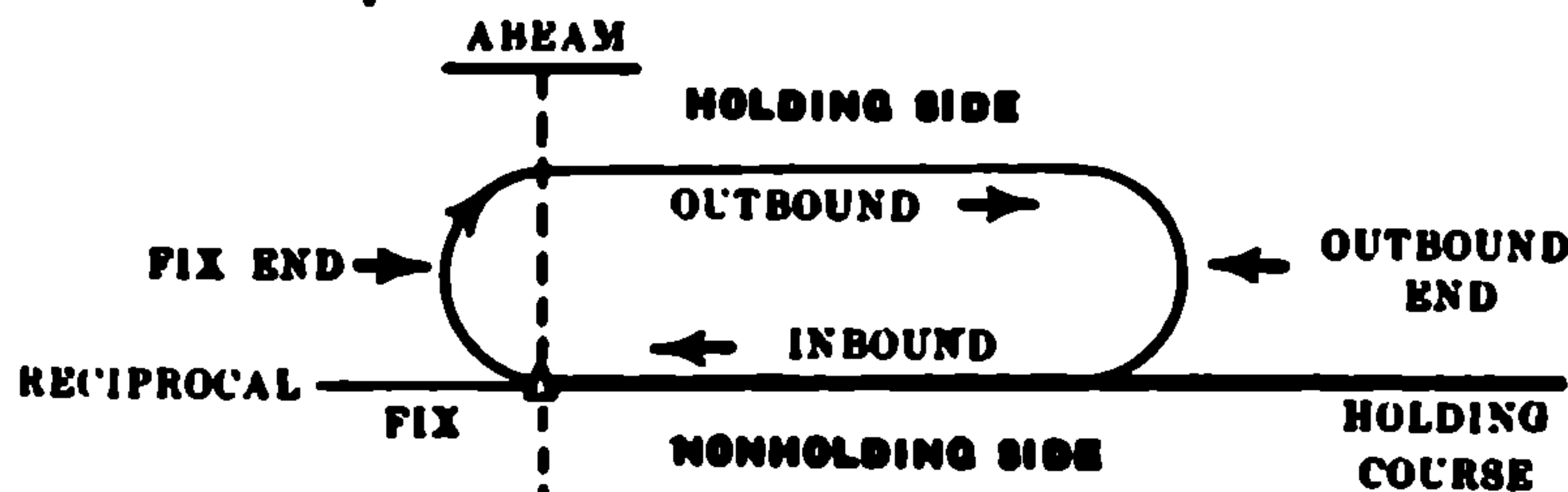


# **HOLDING (Con't)**

5. Holding pattern airspace protection is based on the following procedures. They are the only procedures for entry and holding recommended by F.A.A.

## **a. Entry Procedures**

### **(1) Descriptive Terms**



Standard Pattern : Right turns (illustrated)  
Nonstandard Pattern: Left turns

### **(2) Airspeeds (maximum)**

(a) Propeller-driven ----- 175K IAS

(b) Civil turbojet

1. MHA through 6,000 feet ----- 200K IAS

2. Above 6,000 feet through 14,000 feet ----- 210K IAS

3. Above 14,000 feet ----- 230K IAS

(c) Military turbojet

1. All-except aircraft listed below in (2) and (3) ----- 230 IAS

2. F-84F, F-100<sup>1</sup>, F-102, F-104, F-106, T-38, F-4, F-8, F-11, A-5 ----- 265K IAS

3. F-100<sup>1</sup>, F/RP-101, F-105, B-58 ----- 310K IAS

<sup>1</sup>F-100 holding speed depends upon weight and drag configuration.

(d) Turboprop aircraft may operate at normal climb IAS while climbing in a holding pattern and turbojet aircraft may operate at 310K IAS or less while climbing in a holding pattern.

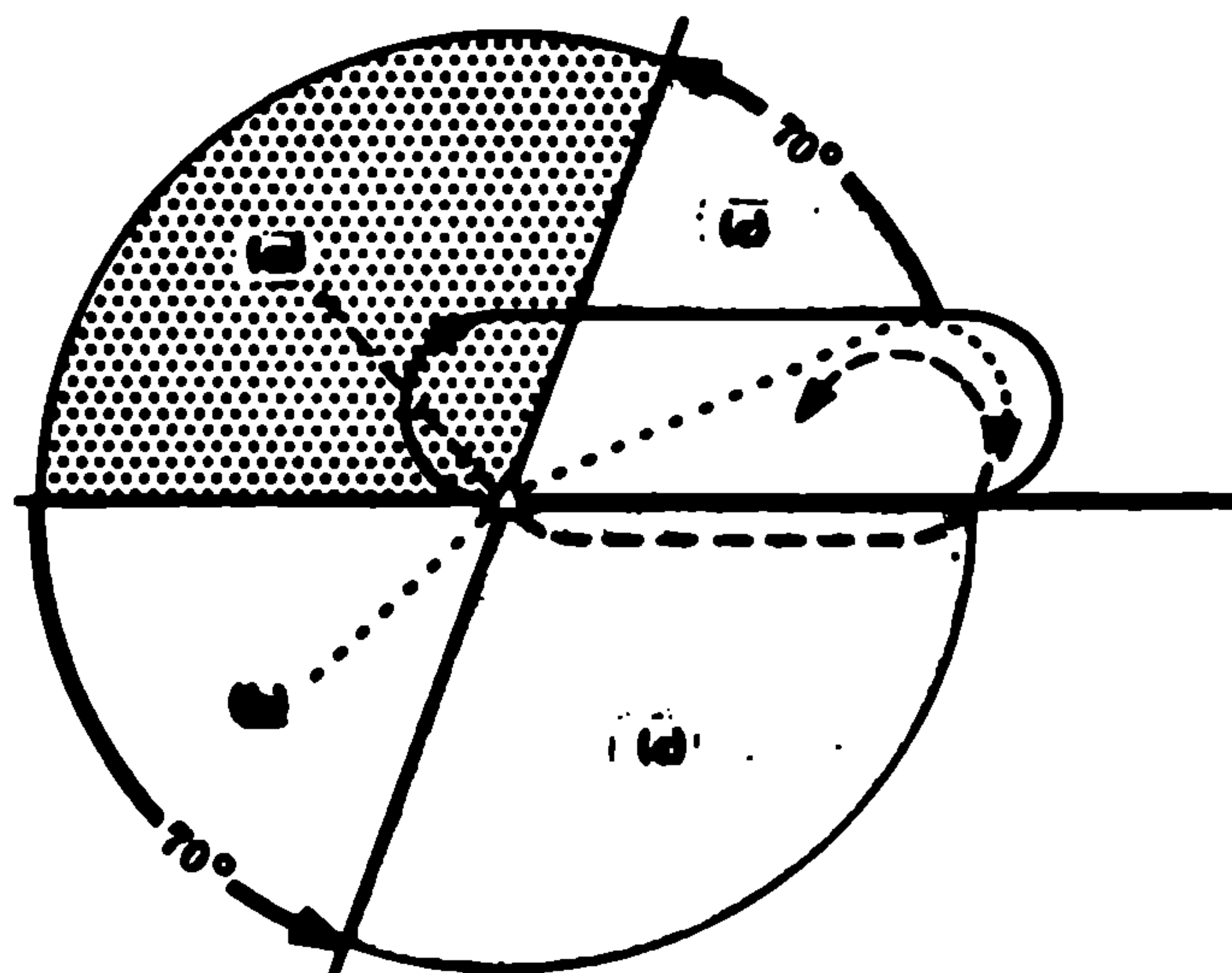
### **(3) Entry**

(a) **Parallel Procedure**—Parallel holding course, turn left, and return to holding fix or intercept holding course.

(b) **Teardrop Procedure**—Proceed on outbound track of 30° (or less) to holding course, turn right to intercept holding course.

(c) **Direct Entry Procedure**—Turn right and fly the pattern.

### **STANDARD PATTERN**



### **(4) Timing**

(a)	At or below 14,000 ft. MSL	Above 14,000 ft. MSL
	INBOUND leg*	1 min. 1½ min.

\*NOTE.—The initial outbound leg should be flown for 1 min. or 1½ min. (appropriate to altitude). Timing for subsequent outbound legs should be adjusted as necessary to achieve proper inbound leg time.

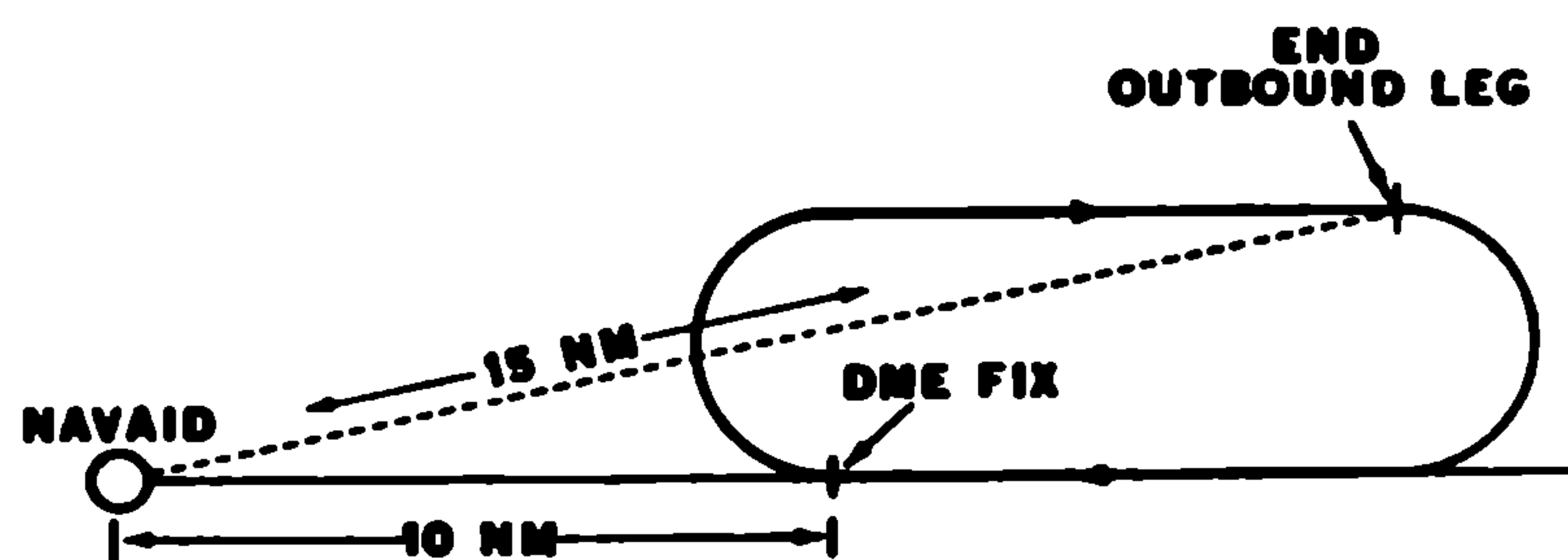
(b) Outbound timing begins *over or abeam* the fix, whichever occurs later. If the *abeam* position cannot be determined, start timing when turn to outbound is completed.

### **(5) Distance Measuring Equipment (DME)**

(a) DME holding is subject to the same entry and holding procedures except that distances (nautical miles) are used in lieu of time values. The *outbound course* of a DME holding pattern is called the outbound leg of the pattern. The length of the outbound leg will be specified by the controller. The end of the outbound leg is determined by the odometer reading.

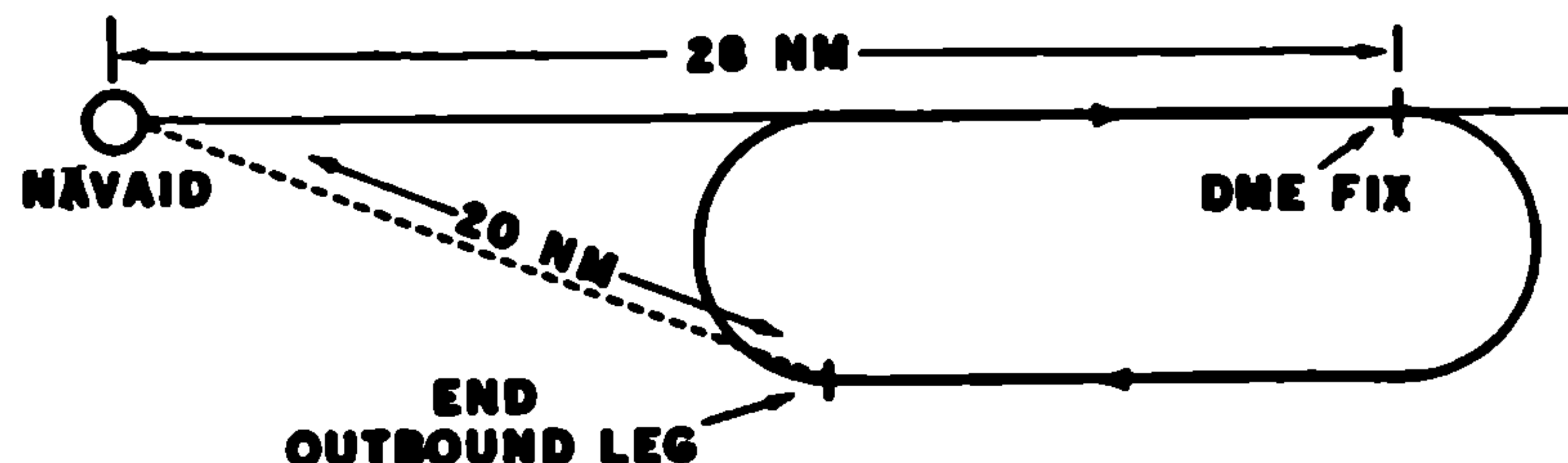
#### **Example:**

When the inbound course is *toward* the navaid and the fix distance is 10 NM, and the leg length is 5 NM, then the end of the outbound leg will be reached when the odometer reads 15 NM.



#### **Example:**

When the inbound course is *away* from the navaid and the fix distance is 28 NM and the leg length is 8 NM, then the end of the outbound leg will be reached when the odometer reads 20 NM.



### **(6) Pilot Action**

(a) Cross holding fix initially at or below maximum holding airspeed. Effect speed reduction within 3 minutes prior to estimated initial time over the holding fix.

(b) Make all turns during entry and while holding at: (1) 3° per second, or (2) 30° bank angle, or (3) 25° bank angle provided a flight director system is used; whichever requires the least bank angle.

(c) Compensate for known effect of wind, except when turning.

(d) Determine entry turn from aircraft heading upon arrival at the holding fix. Plus or minus 5° in heading is considered to be within allowable good operating limits for determining entry.



**HOLDING (Con't)**

●(c) Advise ATC immediately if any increased airspeed is necessary due to turbulence or if unable to accomplish any part of the holding procedures. After such higher speeds are no longer necessary, operate according to the appropriate published nonturbulent air holding speed and notify ATC.

NOTE—Airspace protection for turbulent air holding is based on a maximum of 280K IAS or Mach .8, whichever is lower. Considerable impact on traffic flow will result when turbulent air holding patterns are used; thus, pilot discretion will ensure their use is limited to bona fide conditions/requirements.

(7) **Nonstandard Holding Pattern**—Fix end and outbound end turns are made to the left. Entry procedures to a nonstandard pattern are oriented in relation to the 70° line on the holding side just as in the standard pattern.

6. When holding at a fix and instructions are received specifying the time of departure from the fix, the pilot should adjust his flight path within the limits of the established holding pattern in order to leave the fix at the exact time specified. After departing the holding fix, normal speed is to be resumed with respect to other governing speed requirements such as terminal area speed limits, specific ATC requests, etc. Where the fix is associated with an instrument approach, and timed approaches are in effect, a procedure turn shall not be executed unless the pilot advises ATC, since aircraft holding are expected to proceed inbound on final approach directly from the holding pattern when approach clearance is received.

**7. RADAR SURVEILLANCE OF OUTER FIX HOLDING PATTERN AIRSPACE AREAS.**

a. Whenever aircraft are holding at an outer fix, ATC will usually provide radar surveillance of the outer fix holding pattern airspace area, or any portion of it, if it is shown on the controller's radar scope.

b. The controller will attempt to detect any holding aircraft that stray outside the holding pattern airspace area and will assist any detected aircraft to return to the assigned airspace area.

c. Many factors could prevent ATC from providing this additional service, such as workload, number of targets, precipitation, ground clutter, and radar system capability. These circumstances may make it unfeasible to maintain radar identification of aircraft or to detect aircraft straying from the holding pattern. The provision of this service depends entirely upon whether the controller believes he is in a position to provide it and does not relieve a pilot of his responsibility to adhere to an accepted ATC clearance.

**AIR TRAFFIC CONTROL RADAR BEACON SYSTEM (ATCRBS)****1. GENERAL**

a. Air Traffic Control Radar Beacon System (ATCRBS) is similar to and compatible with military coded radar beacon equipment (Mark X (SIF)). Civil Mode A is identical to military Mode 3.

b. Civil and military transponders except Basic Mark X, should be adjusted to the "on" or normal operating position as late as practicable prior to takeoff and to "off" or "standby" as soon as practicable after completing landing roll unless the change to "standby" has been accomplished previously at the request of ATC.

c. Basic Mark X (IFF) equipment should not be operated except in emergency or at ATC request. ATC will not normally request Basic Mark X (IFF) transponder operation.

d. When filing an IFR flight plan for flight in an aircraft equipped with a radar beacon transponder (no code, 64 code, or 4096 code), DME equipment, or a combination of both, identify equipment capability by adding a suffix to the AIRCRAFT TYPE preceded by a slant, as follows:

- /X (Transponder, no code)
- /T (Transponder, with 64 code capability)
- /U (Transponder, with 4096 code capability)
- /D (DME)
- /L (DME and transponder, no code)
- /B (DME and transponder, with 64 code capability)
- /A (DME and transponder, with 4096 code capability)

NOTE.—The suffix is not to be added to the aircraft identification or be transmitted by radio as part of the aircraft identification.

e. If entering a U.S. domestic control area from outside the U.S., the pilot should advise on first radio contact with a U.S. air traffic control center that such equipment is available by adding "transponder" or "no code transponder" as appropriate, to the aircraft identification.

f. The pilot of a military flight operating on a Mode other than Mode A/3 should adjust his transponder to reply simultaneously on the appropriate Mode A/3 code as set forth herein.

g. Under no circumstances should the pilot of a civil aircraft operate his transponder on Code 0000.

●h. Aircraft are equipped with two basic types of airborne transponders having different select code (4096 or 64) capability on Mode A/3. The 64 select code transponder transmits only the two front digits of the 4096 code scale; e.g., 11 of 1100, 21 of 2132, 31 of 3100, etc. For ATC to utilize one or a combination of the 4096 discrete codes including the 64 basic select codes, FOUR DIGIT CODE DESIGNATION will be used, e.g., code 2100 will be expressed as TWO ONE ZERO ZERO.

●NOTE.—Pilots of a 64 select code transponder equipped aircraft should disregard the last two numerals of the numbered code issued by ATC, e.g., if assigned code 2100 set in numerals 21.

**2. INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLAN**

a. Adjust transponder to reply on the Mode A/3 code specified by ATC. The transponder shall be operated only as specifically directed by ATC. Except as may be required in an emergency, (see para. 5) when a flight has been assigned a code, it should remain on that code until further advised by ATC or until landing roll is completed at destination, at which time the transponder should be placed in "standby" position.

b. If the pilot cancels his IFR flight plan prior to reaching the terminal area of his destination, he should adjust his transponder to Code 0000 or 0700 according to the instructions below for VFR flight.

**3. VISUAL FLIGHT RULES (VFR)**

a. Adjust transponder to reply on the appropriate Mode A/3 code as indicated below, unless otherwise advised by ATC.



**ATC RADAR BEACON SYSTEM (ATCRBS) (Con't)**

(1) Code 0600—for operation below Flight Level 240.

(2) Code 0700—for operation at or above Flight Level 240.

NOTE.—Code 0600 should be used when climbing to Flight Level 240 or above until leaving 23,000 feet MSL. Code 0700 should then be dialed in. When descending from Flight Level 240 or above, Code 0600 should again be used when leaving Flight Level 240.

**4. SPECIAL MILITARY OPERATIONS**

a. Pilots of NORAD interceptor aircraft on air defense missions not under ATC jurisdiction will adjust their transponders to reply on MODE A/3 Code 0000.

b. When prior coordination has been effected with each facility concerned, or when specified in an ALTRV, air defense exercise target aircraft use codes 5000 and 6400 from the point where the strike phase of the mission begins to the target location. When an authorization to deviate from FAR 91.97 has been executed, these aircraft use the "Standby" position of the transponder or one of the other codes allocated to NORAD (up to 14 codes as specified in the authorization in addition to codes 5000 and 6400), between points specified in the route. ATC retains the prerogative to instruct aircraft operating under such an authorization to reply on the appropriate ATC mode and code whenever safety dictates. ATC will be informed when any unscheduled change to the transponder operation is effected.

**5. EMERGENCY OPERATION**

a. When an emergency occurs, the pilot of an aircraft equipped with a coded radar beacon transponder, who desires to alert a ground radar facility to his emergency condition and who cannot establish communications without delay with an air traffic control facility may adjust his transponder to reply on Mode A/3, Code 7700.

b. The pilot should understand that he may not be within a radar coverage area and that, even if he is, certain radar facilities are not yet equipped to automatically recognize Code 7700 as an emergency signal. Therefore, he should establish radio communications with an air traffic control facility as soon as possible.

**6. RADAR BEACON PHRASEOLOGY**

Air traffic controllers, both civil and military, will use the following phraseology when referring to operation of the Air Traffic Control Radar Beacon System (ATCRBS) Mark X IFF (SIF):

**SQUAWK ALFA/THREE CODE (number)**—Operate radar beacon transponder on designated mode and code. (Transponder has not been operating on Mode A/3.)

**SQUAWK CODE (number)**—Operate transponder on a different code. (Transponder is already operating on a previously specified mode and code.)

**SQUAWK IDENT**—Engage the "IDENT" feature (military I/P) of the transponder.

**SQUAWK ALFA/THREE CODE (number AND IDENT)**—Operate transponder on specified mode and code and engage the "IDENT" feature. (Transponder has not been operating on Mode A/3.)

**SQUAWK CODE (number) and IDENT**—Operate transponder on a different code and "IDENT." (Transponder is already operating on a previously specified mode and code.)

**SQUAWK STANDBY**—Switch transponder to standby position.

**SQUAWK LOW/NORMAL**—Operate transponder on low or normal sensitivity as specified. Transponder is operated in "NORMAL" position unless ATC specified "LOW" ("ON" is used instead of "NORMAL" as a master control label on some types of transponders.)

**STOP SQUAWK (mode in use)**—Switch off specified mode (used only when more than one mode may be in operation).

**STOP SQUAWK**—Switch off transponder.

**SQUAWK MAYDAY**—Operate transponder in the emergency position. (Mode A Code 7700 for civil transponder. Mode 3 Code 7700 and/or emergency feature for military transponder.)


**CHANGEOVER POINTS**

1. These points are established on VOR airways in order that pilots will not continue to use the radio guidance display from one facility in the same airspace that other aircraft are using radial guidance from a different facility. These points are based on signal coverage provided by each respective VOR along direct airway segments. The changeover point symbol, as depicted on the En Route Charts, indicates the location in nautical miles between two VOR's along a direct Victor airway at which the aircraft receiver should be tuned to the station ahead.

2. Pilots operating via the Low Altitude Victor Airways System will obtain track guidance by reference to the closest VHF aid forming the airway route segment, except when reference to a specific aid is indicated by a radio changeover point on En Route Charts.

**DIRECTIONAL REPORTING**

1. Some reporting points have been designated as applicable only to specific airways and/or directions of flight. These reporting points will be considered as noncompulsory for the other airways and/or directions of flight. As such, there will be times when a controller will, of necessity, request a position report on the noncompulsory portion. However, this will relieve the undue burden on both the pilot and controller as position reports will be required only as necessary for control purposes. The fact that a reporting point is designated as "directional" does not relieve the pilot of reporting his time and altitude/flight level upon reaching it when it is used as a clearance limit or holding fix.

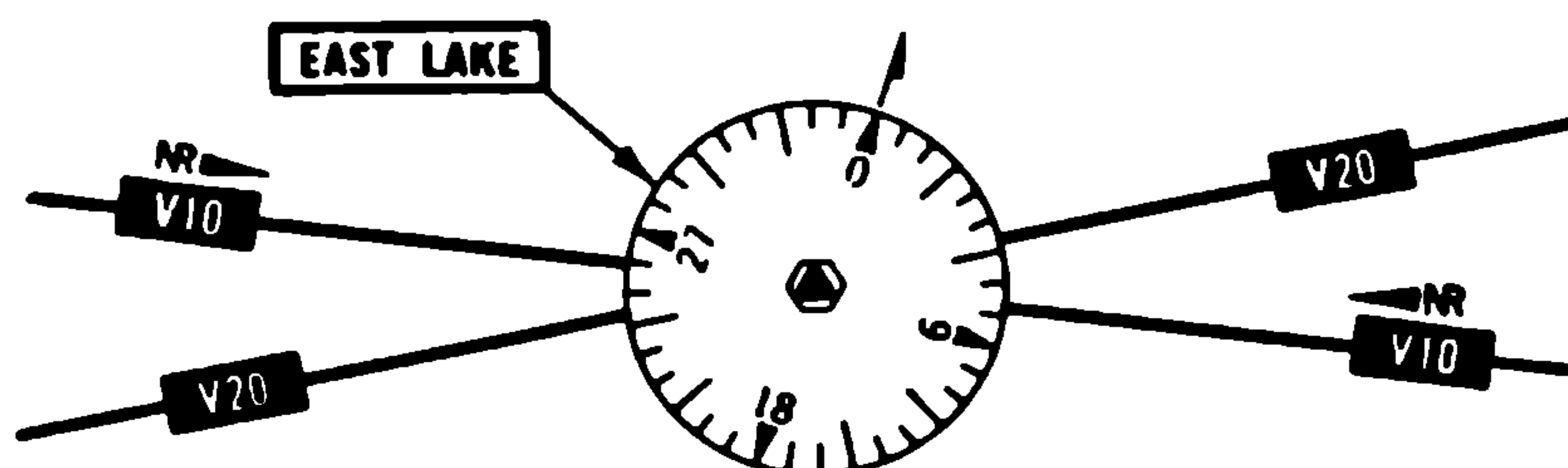
2. The symbol  will be used on Coast and Geodetic Survey and other government aeronautical charts to indicate reporting "Not Required" at the next reporting point unless at that reporting point a transition is made to a "reporting airway." Upon crossing a directional reporting point, a pilot shall report his position if his clearance contains a transition from a non-reporting airway to a reporting airway or from a reporting airway to a non-reporting airway at that reporting point. There are instances where two or more airways utilize the same VOR radial and a position report is not required from aircraft on one or more of these airways but is required from aircraft cleared via the other airway/s; therefore, the symbol is shown in conjunction with the specific airways designator/s to which it applies.

3. The directional requirement applies only to aircraft en route via airways at the reporting point. Aircraft crossing the reporting point, on a direct flight not via airways, shall report the fix. In addition, an aircraft entering or leaving an airway on a direct flight at that reporting point shall report the fix.

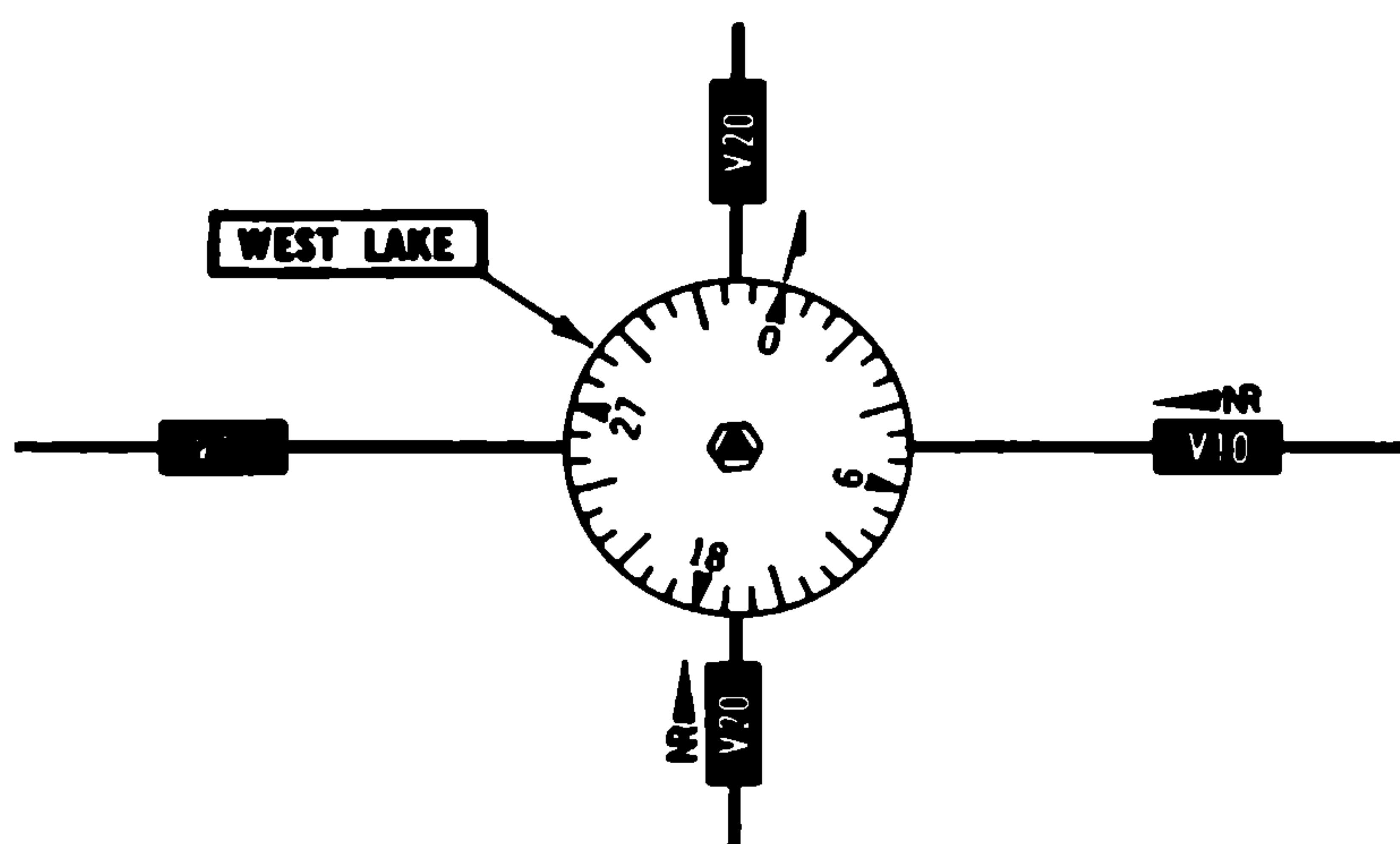


## DIRECTIONAL REPORTING (Con't)

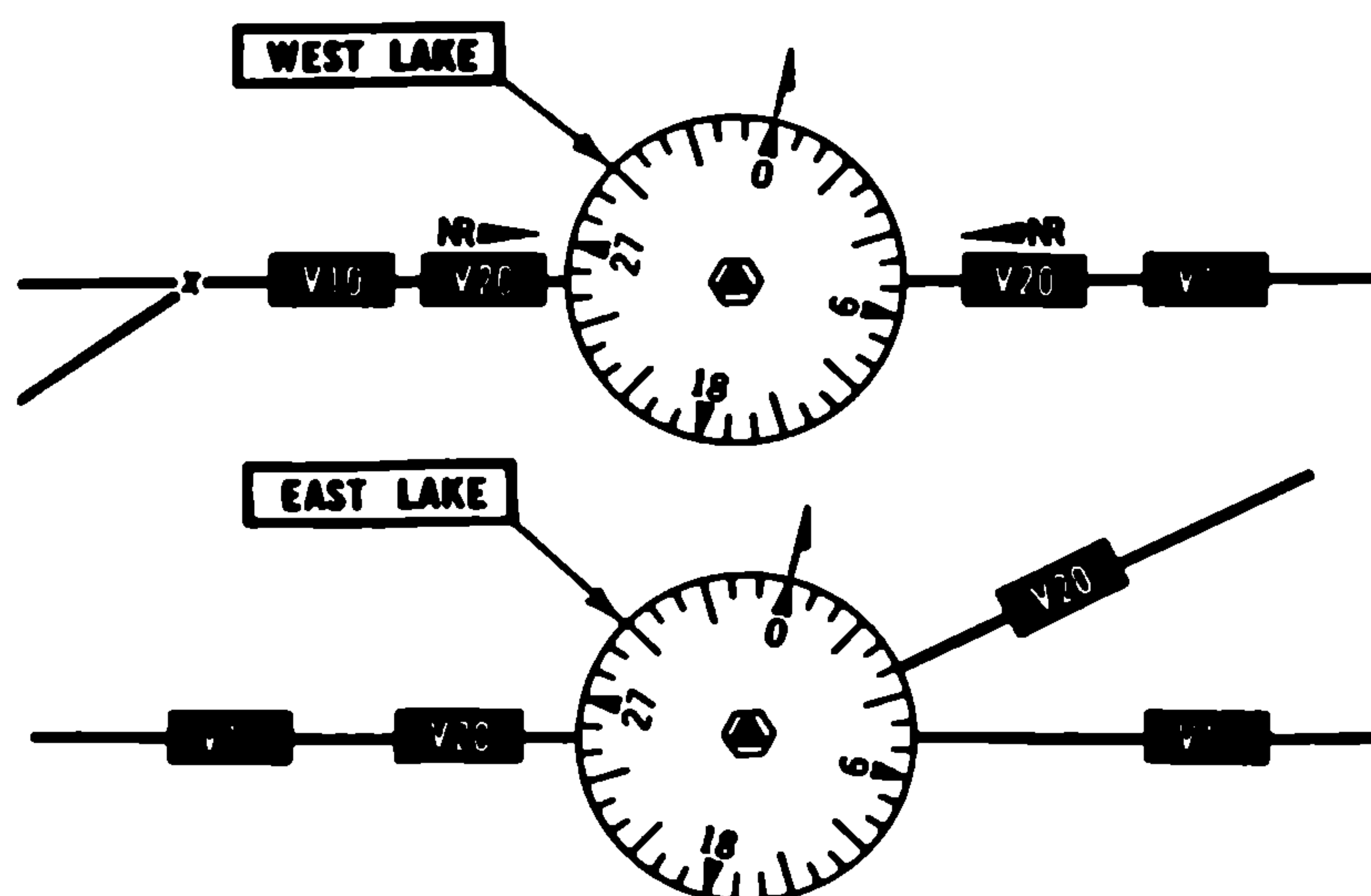
## Examples:



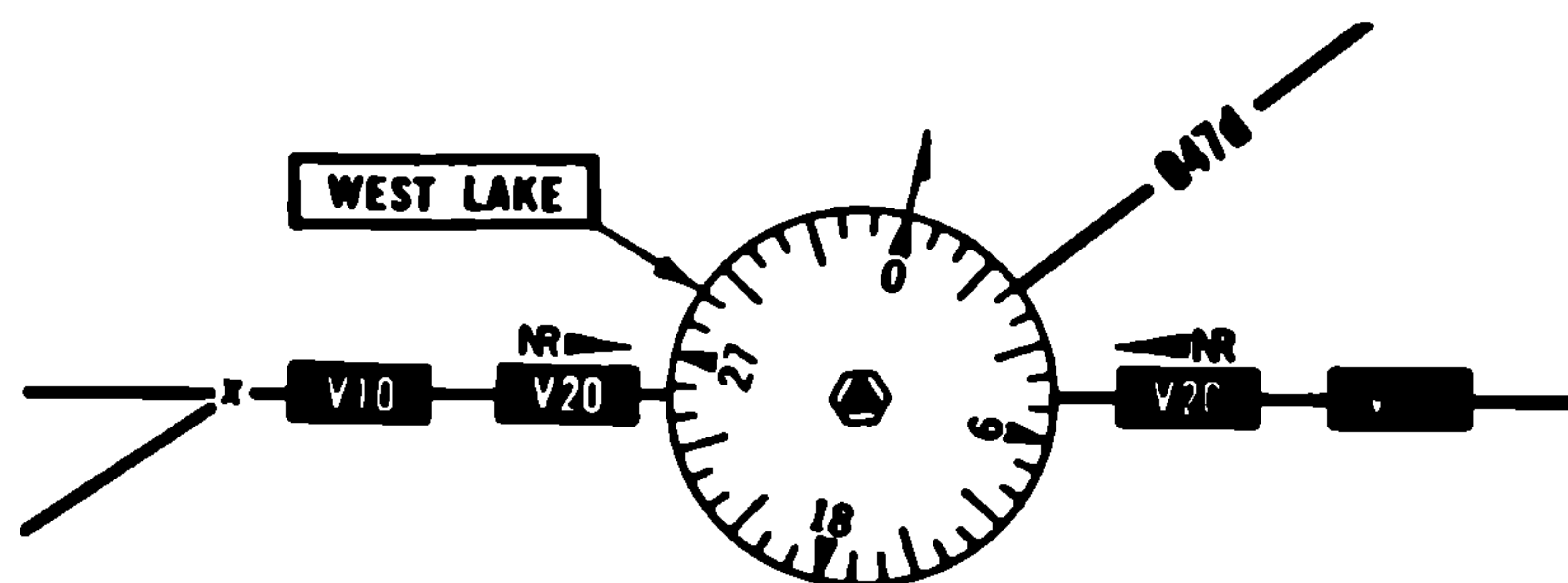
Aircraft proceeding Victor 10 do not report East Lake as the reporting symbol indicates it's not a "reporting airway." The absence of a reporting symbol for Victor 20 denotes it as a "reporting airway" which indicates that aircraft proceeding Victor 20 must report East Lake. Aircraft proceeding Victor 10, East Lake, Victor 20 or Victor 20 East Lake, Victor 10 shall report as their clearance contains a transition to or from a "reporting airway."



Eastbound aircraft on Victor 10 report as the "Not Required" in this instance is for westbound aircraft only. The same principle applies to southbound and northbound aircraft on Victor 20. However, an aircraft proceeding northbound on Victor 20 thence eastbound on Victor 10 would report as a transition is being made to a "reporting airway"; aircraft proceeding westbound on Victor 10 thence northbound Victor 20 would not report as the transition is being made from a "non-reporting airway" to another "non-reporting airway."



This is an example of differing requirements for two airways utilizing the same VOR radial. Aircraft cleared via Victor 10 report West Lake but aircraft cleared via Victor 20 would not. All aircraft report East Lake.



The aircraft on course 047d is a direct off-airways flight and would report West Lake. An aircraft proceeding eastbound or westbound to West Lake thence via the 047d radial shall report West Lake as a transition is being made to a direct course, a situation identical to a "reporting airway."

## AIRCRAFT CLIMBING/DESCENDING

1. During any phase of flight, pilots are requested to adhere to the following procedures whenever cleared by ATC to descend or climb to an altitude or flight level.

a. Unless the ATC clearance requires otherwise, begin descent or climb promptly on acknowledgement of the clearance; and

b. If an altitude change of 1,000 feet or less is required, descend or climb at a rate of not more than 500 feet per minute; or

c. If an altitude change of more than 1,000 feet is required, descend or climb as rapidly as practicable to 1,000 feet above or below the assigned altitude and then at a rate of not more than 500 feet per minute until the assigned altitude is reached.

d. If it is necessary during a climb or descent to level off at an intermediary altitude, advise ATC.

NOTE.—Pilots of military aircraft should use as a minimum the recommended climb and descent rates contained in the aircraft operating handbook.

2. Information is issued to pilots of IFR aircraft whenever less than the applicable minimum time separation between such aircraft will exist, and one aircraft is cleared to climb/descend in accordance with VFR through the altitude of the other. Traffic information is also issued at other times when deemed necessary by the controller or requested by the pilot.

## RESTRICTED AIRSPACE

1. ATC facilities apply the following procedures when aircraft are operating on an IFR clearance (including those cleared by ATC to maintain VFR conditions on top) via a route which lies within joint-use or military climb corridor restricted airspace.

a. The ATC facility controlling an aircraft immediately before it would enter the restricted airspace will coordinate as necessary with the ATC facility designated as the controlling facility or with the using agency to obtain permission for the aircraft to operate in the restricted airspace.

b. If permission is obtained, the ATC facility will allow the aircraft to operate in the restricted airspace without issuing specific clearance for it to do so.



c. If permission cannot be obtained, the ATC facility will issue an amended clearance so the aircraft will avoid the restricted airspace.

2. Note that a, b, c above apply only to joint-use and military climb corridor restricted airspace and not to prohibited and nonjoint-use airspace. For the latter categories, the ATC facility will issue a clearance so the aircraft will avoid the restricted airspace unless it is on an approved altitude reservation mission or has obtained its own permission to operate in the airspace and so informs the controlling facility.

3. Restricted airspace is depicted on the Flight Information Publication, En Route Chart appropriate for use at the altitude or flight level being flown. For joint-use restricted areas including military climb corridors, the name of the controlling agency is shown on these charts. No notation is shown for climb corridors which are under the control of the Air Force Base for which the corridor was designated. For all prohibited areas and non-joint use restricted areas unless otherwise requested by the using agency, the phrase "NO A/G" is shown.

### **RADAR ASSISTANCE TO VFR AIRCRAFT**

1. Radar equipped FAA Air Traffic Control facilities provide assistance and navigation service to VFR aircraft, provided such aircraft can communicate with the facility, are within radar coverage, and can be radar identified. Radar navigation assistance (vectors) may be provided VFR pilots when:

- a. The pilot requests;
- b. The controller suggests and the pilot agrees;
- c. Special programs have been established which specify locations and special VFR service is advertised; or,
- d. When air safety requires in the judgement of the controller.

2. Pilots operating in accordance with Visual Flight Rules and not equipped or trained for IFR flight should use caution in requesting radar assistance as such assistance may result in flight in IFR weather conditions, either intentionally or by accident. In many cases, the radar controller will be unable to determine if flight into instrument conditions will result from his instructions. Furthermore, although the radar controller may be able to provide separation from other traffic and navigational guidance to an airport or other suitable location, the *job of flying the aircraft safely remains with the pilot*. Experience has shown that many pilots cannot maintain control of their aircraft when clouds or other reduced visibility conditions are encountered.

3. To avoid hazards arising from VFR flights being radar vectored into IFR weather conditions, pilots in difficulty should observe the following:

a. If an alternate course of action is available which will permit flight in VFR weather conditions, pilots not instrument rated or operating aircraft not equipped for IFR flight should choose the alternative rather than request radar approach or letdown in IFR weather conditions; or

b. If the pilot is not instrument rated and no alternate course of action is available he should so advise the radar facility and "declare an emergency". The pilot must keep the controller advised of the weather conditions in which the aircraft is operating and along its course ahead. Assistance will be provided on the basis that the navigational guidance information issued is advisory in nature.

c. If the pilot is instrument rated and the aircraft is instrument equipped, the pilot should so indicate by filing an instrument flight plan. Assistance will be provided on the basis that the flight can operate safely in IFR weather conditions.

4. Pilots should clearly understand that authorization to proceed in accordance with such radar navigational assistance does not constitute authorization for the pilot to violate the Federal Aviation Regulations.

### **LAKE, ISLAND, AND MOUNTAIN REPORTING SERVICE**

1. Selected Flight Service Stations provide flight monitoring where regularly traveled VFR routes cross large bodies of water, swamps, and mountains, for the purpose of expeditiously alerting Search and Rescue facilities when required.

2. Areas covered, associated Flight Service Stations, and the name of the service, "Stoneface," "Overlake," etc., are indicated on charts published in Section III. To obtain this service, contact the FSS by telephone or radio giving present position, type aircraft, altitude, indicated airspeed, proposed route of flight, and mainland estimate.

3. After these arrangements have been made, a radio contact with the FSS is required every ten minutes while en route. If contact is lost for more than fifteen minutes, Search and Rescue is alerted.

### **COMMUNICATIONS**

#### **1. POSITION REPORTING**

a. The safety and effectiveness of traffic control depends to a large extent on accurate position reporting. In order to provide the proper separation and expedite aircraft movements, Air Traffic Control must be able to make accurate estimates of the progress of every aircraft operating on an IFR flight plan.

b. When a position report is to be made over a VOR radio facility, the time reported should be the time at which the first complete reversal of the "to-from" indicator is accomplished.

c. When a position report is made over a facility by means of an airborne ADF, the time reported should be the time at which the indicator makes a complete reversal.

d. When an aural or light-panel indication is used to determine the time of passing a reporting point, such as a fan marker, "Z" marker, cone of silence or intersection of range courses, the time should be noted when the signal is first received and again when it ceases. The mean of the two times should then be taken as the actual time over the fix. If position is given with respect to distance and direction from a reporting point, the distance and direction should be computed as accurately as possible.


e. Pilots are required to maintain a continuous listening watch on the appropriate frequency and furnish position reports as indicated by symbol on En Route Charts.

f. The designated reporting point symbol is the solid triangle ( $\blacktriangle$ ); the "on request" reporting point being an open triangle ( $\triangle$ ). Reports over an "on request" reporting point are only necessary when requested by ATC.



**COMMUNICATIONS (Con't)**

(1) **Flights along airways/routes**—A position report is required by all flights regardless of altitude over each designated reporting point along the route being flown, except where otherwise indicated by a "Not Required" symbol. This includes flights operating in accordance with an ATC clearance specifying "VFR conditions on top".

● **NOTE**—In Alaska some position reports are required only when operating below 18,000' MSL and FL 450. These locations are shown on the en route charts by a circled letter "L" leadered to the reporting point:  This procedure does not apply to flights operating on an altitude assignment of "VFR-on-top."

(2) **Flights Along a Direct Route**—Regardless of the altitude being flown, including flights operating in accordance with an ATC clearance specifying "VFR conditions-on-top," pilots shall report over each reporting point used on the flight plan to define the route of flight.

g. Position reports should include the following items: (1) Identification, (2) Position, (3) Time, (4) Altitude, (5) Type of flight plan (not required in IFR position reports made direct to ARTC Centers or approach control), (6) ETA over next reporting point, (7) *The name only of the next succeeding reporting point along the route of flight*, and (8) pertinent remarks.

**Example:**

An aircraft operating along Victor Airway 30 between Pittsburgh and Minneapolis would make the following report when over Litchfield, Mich.: NOVEMBER NINER TWO ONE XRAY OVER LITCHFIELD FIVE SIX AT EIGHT THOUSAND INSTRUMENT FLIGHT PLAN ESTIMATING PULLMAN ONE FOUR ONE EIGHT MILWAUKEE. A corrected estimate should be forwarded to Air Traffic Control any time it becomes apparent that an estimate as previously submitted, is in error in excess of three minutes.

**NOTE**—Pilots in Alaska, Hawaii, U.S. Territories and possessions, operating at or above flight level 240 and who have requested and received a clearance specifying "VFR Conditions On Top" are requested to report their "actual" altitude as part of their IFR position reporting procedure and advise ATC prior to making an altitude change.

h. The following reports should be made to ATC or FSS facilities without request:

(1) The time and altitude/flight level reaching a holding fix or point to which cleared.

(2) When vacating any previously assigned altitude/flight level for a newly assigned altitude/flight level.

(3) When leaving any assigned holding fix or point.

(4) When leaving final approach fix inbound on final approach.

(5) When an approach has been missed. (Request clearance for specific action, i.e., to alternate airport, another approach, etc.)

i. Navigation or position reports will not normally be required by ATC with reference to aids not established for use in the structure in which operation is conducted, except as may be essential for terminal area transition purposes.

j. Pilots encountering weather conditions which have not been forecast, or hazardous conditions which have been forecast, shall forward a report of such weather to

Air Traffic Control. The reporting of unanticipated weather or hazardous conditions may be of importance to the safety of other aircraft proposing flight within the area.

**k. Position reporting in a radar environment:**

(1) Pilots of radar identified aircraft which will remain under radar surveillance may be authorized to discontinue position reports over fixes designated as compulsory reporting points. The controller will grant this authorization using the phraseology "OMIT POSITION REPORTS."

(2) When authorized to omit position reports, the controller, at the time radar service is terminated or at his discretion will issue instructions to resume normal position reporting using the phraseology "RESUME NORMAL POSITION REPORTING."

(3) Monitor normal air traffic control communications frequencies. On initial contact when changing frequencies, pilots should comply with standard contact procedures described in Transfer of Control under 2. DIRECT COMMUNICATIONS — CONTROLLERS/PILOTS.

(4) Pilots of aircraft operating below Flight Level 180, who have been advised to omit position reports, will be furnished the appropriate altimeter setting when passing compulsory reporting points as observed by radar.

**2. DIRECT COMMUNICATIONS—CONTROLLERS/PILOTS**

a. Air Traffic Control facilities are equipped with radio transmitters and receivers for direct communications with IFR air traffic on certain VHF, UHF and L/MF frequencies. The frequencies normally used are published on appropriate en route charts. IFR operations are expedited through the use of direct communications; however, to reduce frequency congestion, pilots are requested to use these frequencies strictly for communications pertinent to the control of IFR aircraft. Flight plan filing, en route weather, forecasts and similar data should be requested through Flight Service Stations, company radio or appropriate military facilities capable of performing these services.

(1) **Center Sector Discrete Frequency**—an ARTCC is divided into sectors; each sector is handled by one Controller, or team of controllers, and has its own sector discrete frequency. As an IFR flight progresses from one sector to an other, the pilot is requested to change to the appropriate sector discrete frequency.

(2) **Center Area Discrete Frequency**—A frequency used as back-up for the center sector frequencies and is available to each non-radar sector in the ARTCC. It is always monitored by at least one controller who can quickly put an IFR flight in radio contact with the appropriate sector.

**b. Transfer of Control**

(1) Air traffic controllers may utilize direct or indirect communications media to require a pilot to contact an adjacent sector within a facility, or an adjacent facility, whenever necessary to effect transfer of control.

(2) The following phraseology will be used to effect transfer of control: "(aircraft identification) CONTACT (facility name) ON (frequency) (time or point), OVER."



# COMMUNICATIONS (Con't)

## Examples:

"BEECHCRAFT TWO ONE BRAVO, CONTACT INDIANAPOLIS CENTER ON ONE TWO FIVE POINT ONE OVER."

"AIR FORCE FIVE FOUR THREE TWO ONE CONTACT ATLANTA CENTER ON THREE ONE SEVEN POINT SIX OR ONE THREE FIVE POINT SIX AT ONE THREE FIVE ZERO, OVER."

"EASTERN FIVE ZERO TWO, CONTACT WASHINGTON CENTER ON ONE TWO THREE POINT SEVEN AT ROANOKE, OVER."

(3) The following phraseologies should be utilized by pilots for establishing contact with the designated facility:

(a) When contact is to be followed by a position report:

"(name) CENTER, (THIS IS) (aircraft identification), (position), OVER."

A typical example of the exchange of communications would be:

"WASHINGTON CENTER, (THIS IS) EASTERN FIVE ZERO TWO, ROANOKE, OVER."

"EASTERN FIVE ZERO TWO, (THIS IS) WASHINGTON CENTER, GO AHEAD."

"EASTERN FIVE ZERO TWO, (OVER) ROANOKE THREE SIX (AT) ONE NINER THOUSAND, (ESTIMATING) MONTEBELLO FIVE TWO, GORDONSVILLE, (OVER)."

"EASTERN FIVE ZERO TWO, ROGER."

(b) When contact is to be made at a specific time or point and no position report is required:

"(name) CENTER, (THIS IS) (aircraft identification), ESTIMATING (reporting point) (time) AT (altitude/flight level), OVER."

"(name) CENTER, (THIS IS) (aircraft identification), ESTIMATING (reporting point) (time) AT (altitude/flight level) CLIMBING/DESCENDING TO (altitude/flight level) OVER."

A typical example of exchange of communications would be:

"CHICAGO CENTER, (THIS IS) BEECHCRAFT ONE TWO THREE FOUR, ESTIMATING CHICAGO HEIGHTS FOUR TWO, AT NINER THOUSAND, DESCENDING TO FIVE THOUSAND, OVER."

"BEECHCRAFT ONE TWO THREE FOUR (THIS IS) CHICAGO CENTER, ROGER."

c. It should be noted that whenever contact with ATC is to be followed immediately by a position report, the name of the reporting point should be included in the contact. This will alert the controller that such information is forthcoming. When a position report is not required, an estimate for the next reporting point, the actual altitude and, if appropriate, the altitude to which climb or descent is being made, should be included in the initial contact. The controller will simply acknowl-

edge that contact has been established, or, when required, issue appropriate control instructions.

NOTE.—Federal Aviation Regulations require the pilot to maintain a continuous watch on the appropriate radio frequencies; therefore, a pilot receiving a clearance as indicated above, should remain on the frequency he is on until the time or point to change to the newly assigned frequency.

NOTE.—If two-way communications cannot be established as indicated in Paragraph b(1), a pilot should attempt to re-contact the transferring controller for the assignment of an alternate frequency or other instructions. If, however, communications are not re-established, the pilot should then contact the appropriate communications medium as indicated in the following Frequency Use Plan.

## 3. FREQUENCY USE PLAN

a. The following table provides a plan by which pilots may determine the frequency they will be expected to use, when the sector discrete frequency (Priority One) has been specified, in effecting transfer of control, and two-way communications cannot be established.

### Priority ----- First

Civil/Military VHF Sector Discrete Frequency as assigned.

Military UHF ----- Sector Discrete Frequency as assigned.

### Priority ----- Second

Civil/Military VHF. Below FL 240—Center Area Discrete Frequency (if appropriate). FL 240 and above—FSS-126.7.

Military UHF ----- FSS-272.7 above FL 240, 255.4 below FL 240.

### Priority ----- Third

Civil/Military VHF Air carrier-company radio, if unable, FSS-126.7 General Aviation and Military FSS-126.7, 122.1/122.2 or VOR

## SPECIAL USE AIRSPACE

1. The following is a brief explanation of the purpose and use of the five types of special use airspace depicted on aeronautical charts published by the Coast and Geodetic Survey.

a. **Prohibited Area.** Airspace of defined dimensions identified by an area on the surface of the earth which the flight of aircraft is prohibited. Such areas are established for security or other reasons associated with the national welfare. These areas are published in the Federal Register.

b. **Restricted Area.** Airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Activities within these areas must be confined because of their nature or limitations imposed upon aircraft operations that are not a part of those activities or both. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to

**SPECIAL USE AIRSPACE (Con't)**

the aircraft and its occupants. Restricted areas are published in the Federal Register and constitute Part 73 of the Federal Aviation Regulations.

**c. Warning Area.** Warning areas are established beyond the three-mile limit. They are areas of defined dimensions established to contain both visible and invisible hazards to nonparticipating aircraft. Though the activities within the warning areas are as hazardous as those contained within restricted areas, warning areas cannot be legally designated because they are over international waters. Penetration of warning areas during periods of activity may be hazardous to the aircraft and its occupants. Official descriptions of warning areas

may be obtained upon request to the FAA, Washington, D.C.

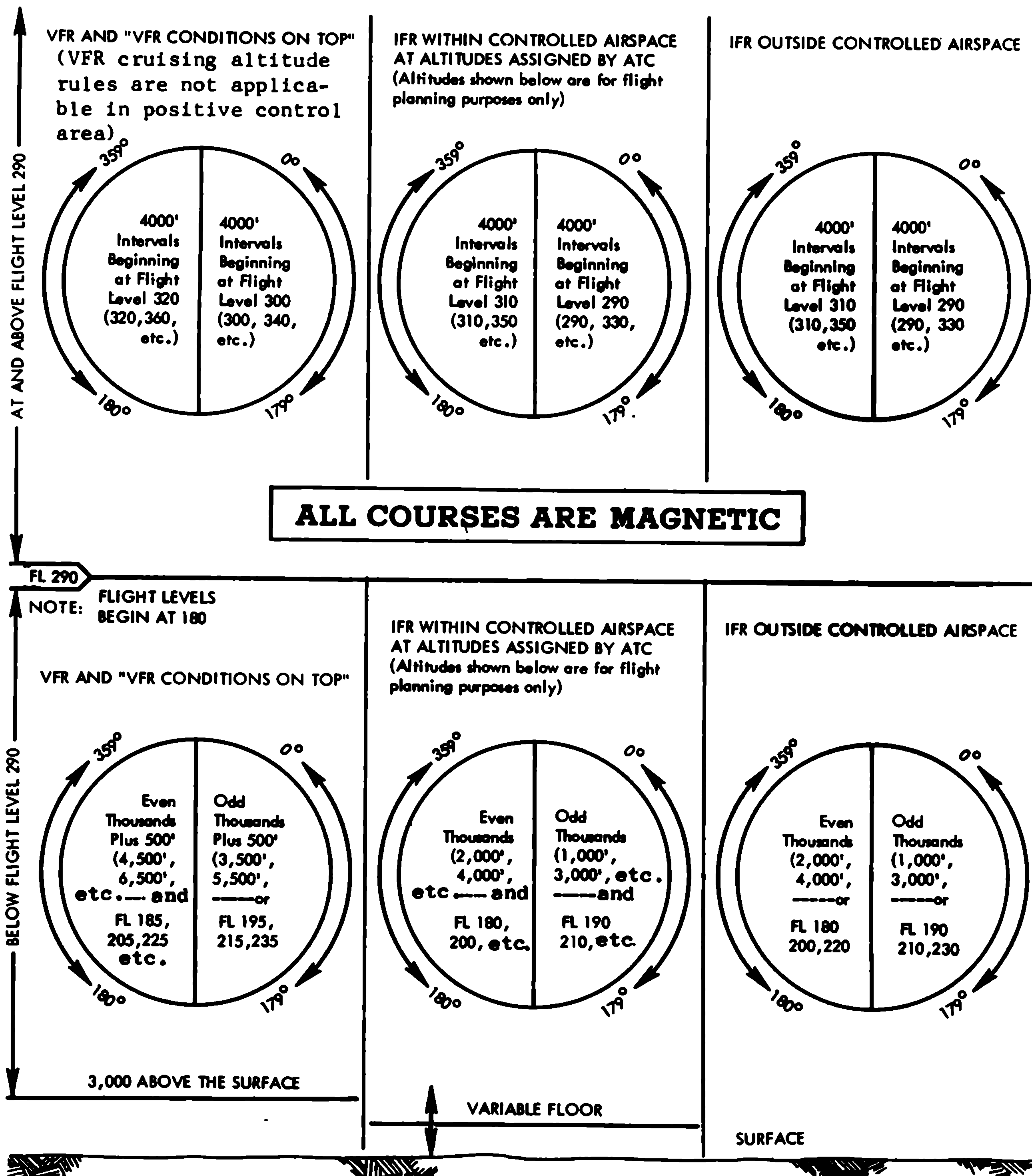
**d. Caution Area.** Areas of defined dimensions within which the military training activities conducted, though not hazardous, are of interest to nonparticipating pilots. There are no restrictions applicable to flight within these areas. Information concerning these areas may be obtained upon request to the FAA, Washington, D.C.

**e. Intensive Student Jet Training Area (ISJTA).** These areas are depicted on aeronautical charts to identify airspace utilized by the military for the intensive training of student jet pilots. There is no restriction to VFR flight in these areas. Information on these training areas may be obtained from any FSS within 100 miles of the area.



# ENROUTE CRUISING ALTITUDES

## FAR PARTS 91.109, 91.121





## ARRIVAL

### VFR ADVISORY INFORMATION

1. VFR advisory information is provided by numerous radar and nonradar *Approach Control* facilities to those pilots intending to land at an airport served by an approach control tower. This information includes: wind, runway, traffic and NOTAM information.

2. Such information will be furnished upon initial contact with concerned approach control facility. The pilot will be requested to change to the *tower* frequency at a predetermined time or point, to receive further landing information.

3. Where available, use of this procedure will not hinder the operation of VFR flights by requiring excessive spacing between aircraft or devious routing. Radio contact points will be based on time or distance rather than on landmarks.

4. Compliance with this procedure is not mandatory but pilot participation is encouraged.

### AIRPORT ADVISORY SERVICE (NONRADAR)

1. Flight Service Stations (FSS) located at airports where there are no control towers in operation provide advisory information to arriving and departing aircraft. This service is offered for safety purposes; traffic control is not exercised.

2. Airport advisories provide: wind direction and velocity, favored runway, altimeter setting, pertinent known traffic, Notices to Airmen, airport taxi routes, airport traffic patterns, and instrument approach procedures. These elements are varied so as to best serve the current traffic situation. Pilots using other than the favored runways should advise the FSS immediately.

3. Recommended phraseologies and communications procedures are as follows:

**AIRCRAFT DEPARTING:** When ready to taxi, the pilot should notify the station of his intentions. Except for scheduled air carriers or other frequent users of the airport, this information should include not only the aircraft identification, but also the aircraft type, location, type of flight planned (VFR or IFR), and destination.

**Example:**

**Aircraft:** GRAND FORKS RADIO, THIS IS COMANCHE SIX ONE THREE EIGHT, ON TERMINAL BUILDING RAMP, READY TO TAXI, VFR TO DULUTH, OVER.

**Station:** COMANCHE SIX ONE THREE EIGHT, THIS IS GRAND FORKS RADIO, WIND THREE TWO ZERO DEGREES AT TWO FIVE FAVORING RUNWAY THREE ONE, ALTIMETER THREE ZERO ZERO ONE, TIME ONE TWO TWO FIVE, CESSNA ONE-SEVENTY MAKING TOUCH AND GO LANDINGS ON RUNWAY THREE ONE.

**NOTE.**—The take-off time should be reported to the FSS as soon as practicable. If the aircraft has limited equipment and it is necessary to use the navigational feature of the radio range immediately after take-off, advise the FSS of this before shifting frequency from 122.2 to the range. In such cases, advisories will be transmitted over both 122.2 and the range frequency.

**AIRCRAFT ARRIVING:** When operating VFR, a pilot should transmit position and altitude information to the FSS when 15 miles from the airport.

**Example:**

**Aircraft:** GRAND FORKS RADIO, THIS IS TRIPACER ONE SIX EIGHT NINER, OVER KEY WEST, TWO THOUSAND, LANDING GRAND FORKS, OVER.

**Station:** TRIPACER ONE SIX EIGHT NINER, THIS IS GRAND FORKS RADIO, OVER KEY WEST AT TWO THOUSAND, WIND ONE FIVE ZERO DEGREES AT ONE TWO, FAVORING RUNWAY ONE THREE, ALTIMETER TWO NINER EIGHT NINER, DC-3 TAKING-OFF RUNWAY ONE THREE, CESSNA ONE FORTY ON DOWNWIND LEG RUNWAY ONE THREE MAKING TOUCH AND GO LANDINGS, COMANCHE DEPARTED RUNWAY ONE THREE AT ONE SIX PROCEEDING EASTBOUND, OVER.

**NOTE.**—Pilots should guard 122.2 mcs. until clear of the runway after landing and report leaving the runway to the FSS.

### RADAR TRAFFIC INFORMATION SERVICE

1. A service provided by radar air traffic control facilities. Pilots receiving this service are advised of any aircraft observed on the radar scope which, in the judgment of the controller, appears to constitute a potential conflict to the operation of their aircraft.

**a. Purpose of the Service.**—Radar Traffic Information Service is not intended to relieve the pilot of his responsibility for continual vigilance to see and avoid other aircraft. It is provided to aid him in his visual surveillance.



**RADAR TRAFFIC INFORMATION SERVICE (Con't)**

lance by calling to his attention a specific direction in which radar indicates possible conflicting traffic to exist. Pilots are reminded that the surveillance radar utilized by the controller does not provide altitude information.

**b. Provision of the Service**—The provision of this service is not mandatory. Many factors, such as limitations of the radar, volume of traffic, controller workload and communications frequency congestion, could prevent the controller from providing this service. The controller possesses complete discretion for determining whether he is able to provide or continue to provide this service in a specific case. His reason against providing or continuing to provide the service in a particular case is not subject to question nor need it be communicated to the pilot. In other words, the provision of this service is entirely dependent upon whether the controller believes he is in a position to provide it, subject to the foregoing limitations:

(1) Traffic information is routinely provided to all aircraft operating on IFR flight plans except when the pilot advises he does not desire the service.

(2) Traffic information may be provided for flights not operating on IFR flight plans when requested by pilots of such flights.

**NOTE**—Participation by VFR pilots in formal programs implemented at certain terminal locations constitutes pilot request. This also applies to participating pilots at those locations where arriving VFR flights are encouraged to make their first contact with the tower on the approach control frequency.

**c. Issuance of Traffic Information**—Traffic information will include the following concerning a target which may constitute traffic for an aircraft that is:

(1) Radar identified:

(a) Azimuth from the aircraft in terms of the twelve hour clock;

(b) Distance from the aircraft in nautical miles;

(c) Direction in which the target is proceeding;

and

(d) Type of aircraft and altitude or, if unknown, the relative speed of the observed traffic; i.e., slow or fast moving.

**Example:**

Traffic 10 o'clock, 3 miles, west-bound (type aircraft and altitude, if known or relative speed of the observed traffic). The pilot may, upon receipt of traffic information, request a vector (heading) to avoid such traffic. The vector will be provided to the extent possible as determined by the controller.

(2) Not radar identified:

(a) Distance and direction with respect to a fix;

(b) Direction in which the target is proceeding;

and

(c) Type of aircraft and altitude or, if unknown, the relative speed of the observed traffic, i.e., slow or fast moving.

**Example:**

Traffic 8 miles out of the airport northeast-bound, (type aircraft and altitude or relative speed of the observed traffic).

**EXPANDED RADAR SERVICE FOR ARRIVING AND DEPARTING FLIGHTS IN TERMINAL AREAS**

1. This service has been implemented at certain terminal locations. Pilot participation is urged but is not mandatory.

2. The purpose of this service is to adjust the flow of arrival VFR and IFR aircraft into the traffic pattern in a safe and orderly manner. To participate, pilots of VFR aircraft should initiate radio contact with approach control when reaching the perimeter of the area in which the VFR services are provided. Approach control then provides the pilot with wind direction and velocity, runway in use, traffic information, routings, etc., as necessary, for proper sequencing with other traffic en route to the airport.

3. After radar contact is established, the pilot is directed to fly specific headings either to join an appropriate leg of the traffic pattern or to position the flight behind the preceding aircraft in the landing sequence. When a flight is positioned behind the preceding aircraft and the pilot reports having that aircraft in sight, he will be directed to follow it. Upon being told to contact the tower, radar service will end. A landing sequence number will thereafter be assigned by the tower.

4. Pilots of departing VFR aircraft desiring Traffic Information Service should request the service on initial contact with ground control and advise proposed direction of flight. Following take-off, the tower will advise when to contact departure control and the frequency to be used.

**TERMINAL RADAR SERVICE**

(Provided in designated Terminal Radar Service Areas, TRSA).

1. This service has been implemented at certain terminal locations and is provided on a voluntary pilot participating basis.

2. The purpose of this service is to provide, to the extent possible separation between all participating VFR aircraft and all IFR aircraft operating within the airspace defined as the TRSA.

3. The TRSA is primarily a radar environment and control is predicated thereon, however, this does not preclude application of nonradar separation when required or deemed appropriate. During weather conditions equal to or better than basic VFR:

(a) 500 feet vertical separation may be used between VFR aircraft and/or between VFR and IFR aircraft.

(b) Visual separation may be used between VFR aircraft and/or between VFR and IFR aircraft when the pilot sees the other aircraft and reports he will maintain visual separation from it.

4. Within the TRSA traffic information on observed but unidentified targets will, to the extent possible, be provided all IFR and participating VFR aircraft and such aircraft, at the request of the pilot, will be vectored to provide standard radar separation from the observed traffic, insofar as possible.



### AERONAUTICAL ADVISORY STATIONS (UNICOM)—122.8, 123.0 MC.

1. 122.8 mc is assigned to airports *not* served by a control tower. Its use is limited to the necessities of safe and expeditious operation of private aircraft pertaining to runway and wind conditions, types of fuel available, weather, and dispatching. Secondly, communications may be transmitted concerning ground transportation, food and lodging during transit.

2. 123.0 mc is assigned to airports *served* by a control tower. Communications on this frequency are identical to those permitted on 122.8 mc, with the exception of information such as runway and wind conditions, weather, etc. which would be furnished by the tower. **THIS SERVICE SHALL NOT BE USED FOR AIR TRAFFIC CONTROL PURPOSES.**

### AERONAUTICAL MULTICOM SERVICE 122.9 MC.

1. A mobile service used to provide communications essential to conduct of activities being performed by or directed from private aircraft.

**Example:**

Ground/air communications pertaining to agriculture, ranching, conservation activities, forest fire fighting, aerial advertising and parachute jumping. **THIS SERVICE SHALL NOT BE USED FOR AIR TRAFFIC CONTROL PURPOSES.**

### APPROACH CONTROL

1. Approach control is responsible for controlling all instrument flight terminating within its area of responsibility. Approach control may serve one or more airfields, and control is exercised primarily by direct pilot/controller communications. Prior to arriving at the destination radio facility, instructions will be received from ARTCC to contact on approach control.

**a. Radar Approach Control**

(1) Arriving aircraft are either cleared to an outer fix most appropriate to the route being flown with vertical separation and, if required, holding information or, when radar handoffs are effected between the ARTCC and approach control, or between two approach control facilities, aircraft are cleared to the airport or to a fix so located that the handoff will be completed prior to the time the aircraft reaches the fix. When radar handoffs are utilized, successive arriving flights may be handed off to approach control with radar separation in lieu of vertical separation. After release to approach control, aircraft are vectored to the appropriate final approach course (ILS, VOR, ADF, etc.). Radar vectors and altitude/flight levels will be issued as required for spacing and separating aircraft. *Therefore, pilots must not deviate from the headings issued by approach control.* The radar vector issued for interception of the final approach course will be such as to enable the pilot to establish his aircraft on the final approach course prior to reaching the approach fix. Aircraft will be cleared for approach at the time the final heading for interception of the final approach course is issued, or after the aircraft is established on the final approach course prior to passing the approach fix. When established on the final approach course, radar separation will be maintained and the

pilot will be expected to complete the approach utilizing existing approach aids (ILS, radio beacons, etc.) as the primary means of navigation. *Therefore, pilots must not deviate from the normal final approach course unless a clearance to do so is received from Air Traffic Control.* After passing the approach fix (outer marker, radio range, etc.) on final approach, aircraft are expected to proceed direct to the airport and complete the approach or effect the missed approach procedure published for that airport.

(2) IFR aircraft may be descended to the minimum vectoring altitude, vectored to a position in the airport traffic pattern and cleared for a "visual approach" whenever the reported ceiling is at least 500 feet above the minimum vectoring altitude and the visibility is three miles or more. With a "visual approach" clearance, the pilot operating on an IFR flight plan may deviate from the prescribed instrument approach procedure and proceed to the airport with visual reference to the surface, maintaining VFR conditions at all times. This procedure will afford a more expeditious service to arriving aircraft and preclude unnecessary vectoring in the final approach course of a published instrument approach procedure.

(3) Clearance for a visual approach is issued when:

(a) The pilot of an aircraft not following a preceding aircraft reports sighting the airport and the tower controller has the aircraft in sight, or

(b) An aircraft is positioned behind a preceding aircraft and the pilot of the succeeding aircraft reports sighting that aircraft.

(4) Radar separation is provided from any preceding IFR aircraft until the clearance for a visual approach is issued. Pilots cleared for a visual approach are reminded to advise ATC whenever they are unable to continue following the preceding aircraft and/or they encounter less than basic VFR weather conditions. Radar service will be terminated when the pilot is told to contact the tower. The tower will assign a landing sequence number.

### INSTRUMENT APPROACH

#### 1. GENERAL

a. Instrument approach procedures are depicted on Const and Geodetic Survey Approach and Landing Charts. Air Traffic Control may suggest a specific instrument approach procedure to expedite traffic. This is usually accomplished by issuing a clearance for the specific approach. If the pilot of the aircraft does not desire such approach he may request a different type of approach. However, it may be necessary for Air Traffic Control to withhold a clearance for the different approach until such time as traffic conditions permit. Under such circumstances the pilot of the approaching aircraft may accept the suggested approach or wait for a different approach. The omission of a specific type of approach in the clearance, "Cleared for Approach," indicates to the pilot any approved type of approach may be used at his discretion and he should begin descent to approach altitude as soon as possible. Normally, traffic conditions require Air Traffic Control to issue a clearance specifying the type of approach. If the pilot is involved in an emergency situation, he will be given priority in the type of approach as may be necessary under the circumstances.



# INSTRUMENT APPROACH (Con't)

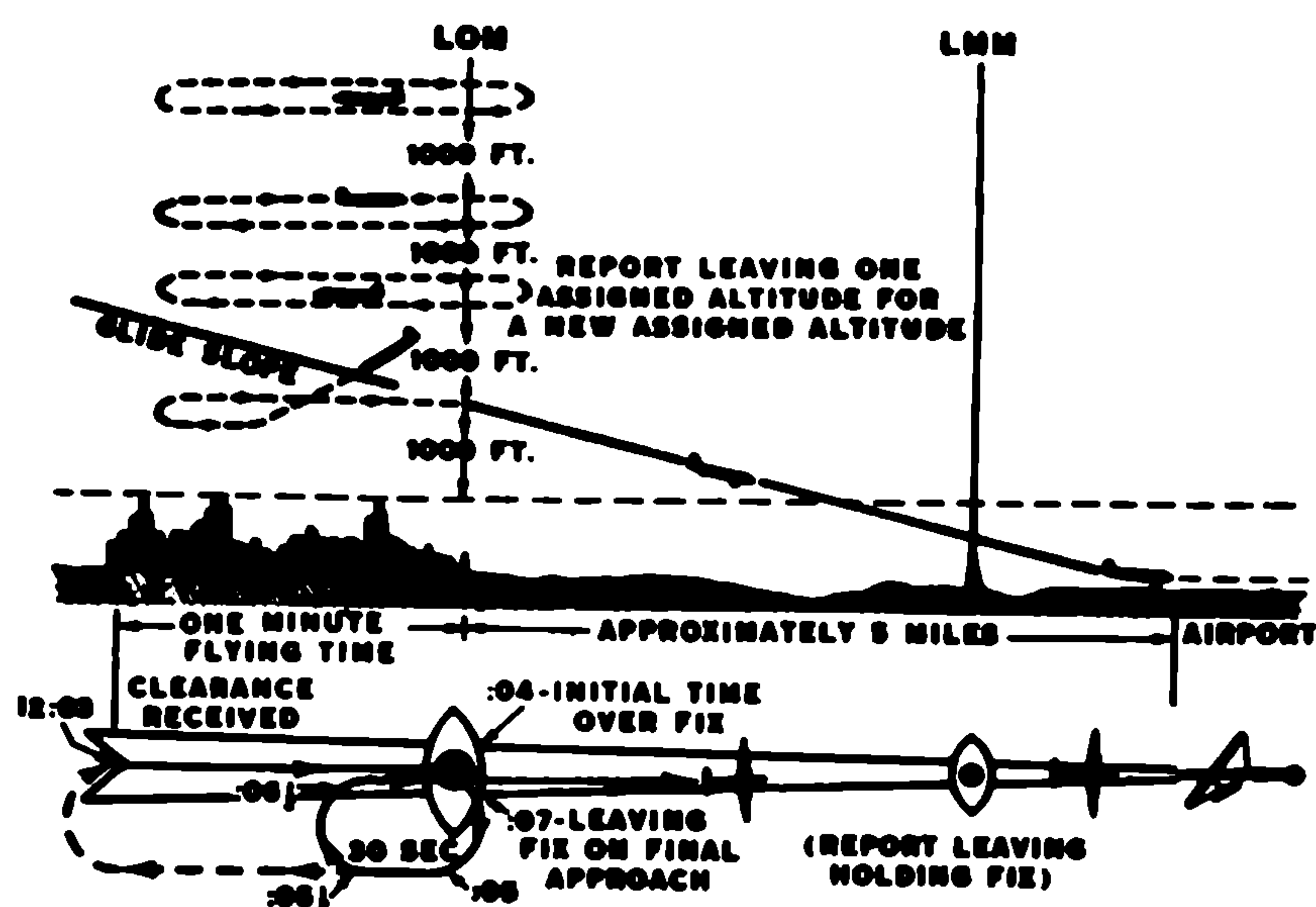
b. If the pilot is not familiar with the specified approach procedure, Air Traffic Control should be advised and the clearance will include detailed information on the execution of the specified approach. When an approach involves a procedure turn, the turn normally shall be executed within a distance of ten miles from the facility. However, in order to provide adequate separation from departing traffic, Air Traffic Control may specify the point at which the turn shall be executed (expressed in minutes or miles outbound from the facility) which will be consistent with the limitations of the specific approach procedure for the airport.

## 2. INSTRUMENT APPROACH FROM HOLDING PATTERN

a. Each pilot in an approach sequence will be given advance notice as to the time he should leave the holding point on approach to the airport. When a time to leave the holding point has been received, the pilot should adjust his flight path to leave the fix as closely as possible to the designated time.

### Example:

The dotted line indicates a 1-minute holding pattern, the solid line indicates the aircraft flight path from the time clearance was received.



b. At 12:03 local time, in the example shown, a pilot holding, receives instructions to leave the fix inbound at 12:07. These instructions are received just as the pilot has completed turn at the outbound end of the holding pattern and is proceeding inbound towards the fix. Arriving back over the fix, the pilot notes that the time is 12:04 and that he has three minutes to lose in order to leave the fix at the assigned time. Since the time remaining is more than two minutes, the pilot plans to fly a race pattern rather than a 360° turn, which would use up two minutes. The turns at the ends of the race track pattern will consume approximately two minutes. Three minutes to go, minus two minutes required for turns, leaves one minute for level flight. Since two portions of level flight will be required to get back to the fix inbound, the pilot halves the one minute remaining and plans to fly level for 30 seconds outbound before starting his turn back toward the fix on final approach. If the winds were negligible at flight altitude, this procedure would bring the pilot inbound across the fix precisely at the specified time of 12:07. However, if the pilot ex-

pected a headwind on final approach, he should shorten his 30 seconds outbound course somewhat, knowing that the wind will carry him away from the fix faster while outbound and decrease his ground speed while returning to the fix. On the other hand, if the pilot knew he would have a tailwind on final approach, he should lengthen his calculated 30-second outbound heading somewhat, knowing that the wind would tend to hold him closer to the fix while outbound and increase his ground speed while returning to the fix.

## 3. LANDING PRIORITY

a. A clearance for a specific type of approach (ILS, ADF, VOR or Straight-In Approach) to an aircraft operating on an IFR flight plan does not mean that landing priority will be given over other traffic. Traffic control towers handle all aircraft, regardless of the type of flight plan, on a "first-come, first-served" basis. Therefore, because of local traffic or runway in use, it may be necessary for the controller, in the interest of safety to provide a different landing sequence. In any case, a landing sequence will be issued each aircraft as soon as possible to enable the pilot to properly adjust his flight path.

## 4. LANDING MINIMUMS

a. The minimum ceiling and visibility requirements for civil pilots making instrument approaches at civil airports are included on Standard Instrument Approach Procedures.

b. The following procedures are applicable to all arriving IFR civil aircraft conducting published instrument approaches.

c. When an official weather report is made available to the controller which indicates that weather conditions are below the minima published for the particular approach being executed or to be executed, ATC will:

(1) Issue the weather report to all arriving IFR aircraft.

(2) Advise pilots of other than military or scheduled air carrier aircraft that the reported weather is below the published minima and request such pilots to advise their intentions.

### Example:

WEATHER (Weather Report). THIS IS BELOW PUBLISHED MINIMA FOR (Type of Approach) APPROACH. ADVISE INTENTIONS.

(3) Issue approach clearance, landing clearance or other clearances and/or instructions, as appropriate, in accordance with each pilot's stated intentions and the traffic situation. Each landing clearance shall be expressly qualified with the phrase "IF YOU HAVE LANDING MINIMA".

### Example of Landing Clearance:

CLEARED TO LAND IF YOU HAVE LANDING MINIMA.

NOTE.—The foregoing procedures are predicated on the basis that: The Weather Bureau Report, RVR reading and/or runway visibility report, as appropriate, constitutes the official weather report, and the weather minima published for the particular approach on Instrument Approach Procedure Charts, as amended by NOTAMS, if any, are applicable. The pilot is governed by and will be observing the provisions, of Part 609.4/G/ Regulations of the Administrator.



**INSTRUMENT APPROACH (Con't)****5. MONITORING ILS**

a. Communications should be established with the appropriate FAA control tower or with the FAA Flight Service Station, where there is no control tower, prior to starting an ILS approach. This is in order to receive advisory information as to the operation of the facility. It is also recommended that the aural signal of the ILS be monitored during an approach to assure continued reception and receipt of advisory information.

**6. CONTACT APPROACH**

a. Pilots operating in accordance with an IFR flight plan, provided they are clear of clouds and have at least 1 mile flight visibility and can reasonably expect to continue to the destination airport in those conditions, may request ATC authorization for a "contact approach," (see definition in Section III glossary of aeronautical terms).

b. Controllers may authorize a "contact approach" provided:

(1) A pilot so requests;

(2) The reported ground visibility at the destination airport is at least:

(a) One-half statute mile for air carrier aircraft (Operations Specification permit certain Air Carriers to land under such conditions when the reduced visibility is due to a local surface restriction), or

(b) One statute mile for all other aircraft; and

(3) Approved (IFR) separation can be applied between aircraft so cleared and between those aircraft and other aircraft.

**Example:**

**CLEARED FOR CONTACT APPROACH, MAINTAIN NOT ABOVE (altitude) (routing and/or reports as required) IF NOT POSSIBLE (alternative procedures) AND ADVISE.**

c. This procedure is intended primarily as an alternative for a prescribed instrument approach procedure and pilots should use discretion in conducting a contact approach. The pilot must realize that he assumes the responsibility for obstruction clearance by electing to abandon the safeguards which are guaranteed by compliance with a published instrument approach procedure.

**7. MISSED APPROACH**

a. When a landing is not completed after an instrument approach, a pilot shall follow the prescribed missed approach procedure (unless an alternate missed approach procedure is specified by Air Traffic Control) and obtain further clearance from Air Traffic Control. The flight then may request clearance for another approach. Traffic permitting, an approach clearance may be issued immediately or the flight may be required to hold until clearance for approach can be issued. A pilot may, at any time, request clearance to an alternate airport.

**RADAR MONITORING OF INSTRUMENT APPROACHES**

1. When approaches are being monitored by radar, the radar advisories serve only as a secondary aid, since the pilot has selected the ILS or other navigational aid as the primary aid for the approach.

2. At FAA radar locations, all instrument approaches made on navigational aids whose final approach course from the final approach fix to the runway coincides with the Precision Approach Radar (PAR) course and whose final approach fix lies within the coverage of PAR will be monitored and radar advisories furnished to the pilot whenever the reported weather is below basic VFR minima (1000 and 3).

3. Prior to starting final approach, the pilot will be advised of the frequency on which the advisories will be transmitted. This will normally be the ILS localizer voice channel. If, for any reason, radar advisories cannot be furnished, the pilot will be so advised.

4. Advisory information, derived from radar observations, includes information on:

a. Passing the final approach fix. (At this point, the pilot may be requested to report sighting the approach lights or the runway.)

b. Distance above or below the prescribed glide path (*this information given only to those aircraft executing an ILS approach*) and/or the distance left or right of the prescribed final approach course when an aircraft exceeds the elevation and/or azimuth safety zones indicated on the PAR display.

NOTE.—Altitude information is not transmitted to aircraft executing other than ILS approaches because the descent portions of these approaches generally do not coincide with the depicted PAR glide path.

c. A situation which, in the judgment of the controller, is likely to affect the safety of the flight.

5. Radar advisories and radar service will be terminated and the pilot so informed when:

a. The pilot reports the approach lights or the runway in sight, or

b. The aircraft reaches the ILS middle marker or a point corresponding in distance to the point where the glide slope intercepts 200 feet elevation, whichever is closer to the end of the runway.

**SPEED ADJUSTMENT OF ARRIVING AIRCRAFT**

1. To avoid excessive vectoring in the establishment of arrival sequences, pilots of radar-controlled arriving aircraft which are transitioning from en route to the destination airport may be requested by ATC to adjust aircraft speeds in accordance with the following:

a. All speed adjustment requests shall be expressed in terms of knots and shall be predicated on indicated air speed (IAS).

b. Speed adjustment procedures shall not be applied to flights conducting published jet penetrations.

c. Pilots complying with speed adjustment requests will be expected to maintain a speed within plus or minus ten knots of the specified speed.

d. Approach clearances supersede speed adjustment assignments and pilots are expected to effect their own speed adjustments, as necessary, to complete the approach. If it is determined by ATC that speed adjustment procedures are no longer required prior to the issuance of an approach clearance, the pilot of the aircraft concerned shall be advised to resume normal speed.



**SPEED ADJUSTMENT OF ARRIVING AIRCRAFT (Con't)**

e. Unless prior concurrence in the use of a lower speed is obtained, speed adjustment requests for an arriving flight to maintain a specified speed will be made in accordance with the following minima:

(1) To multi-engine turbojet and propeller-driven aircraft which are operating more than 30 nautical miles from destination airport:

**A SPEED NOT LESS THAN 250 KNOTS IAS;**

(2) To multi-engine turbo jet and propeller-driven aircraft which are operating 20 to 30 nautical miles from destination airport, and

(a) At or above 10,000' MSL:

**A SPEED NOT LESS THAN 250 KNOTS IAS; or**

(b) Below 10,000' MSL:

**A SPEED NOT LESS THAN 200 KNOTS IAS;**

(3) To multi-engine jet aircraft which are operating less than 20 nautical miles from destination airport:

**A SPEED NOT LESS THAN 180 KNOTS IAS; or**

(4) To multi-engine propeller-driven aircraft which are operating less than 20 nautical miles from destination airport:

**A SPEED NOT LESS THAN 150 KNOTS IAS.**

**NOTE.**—Controllers have been advised that utilization of the minimum speeds set forth above for propeller-driven aircraft will sometimes be impractical, since some aircraft in this category cruise at lower speeds and cannot attain the speeds specified.

f. Speed adjustment of multi-engine propeller-driven aircraft which cannot attain the minimum speeds set forth above, or of single-engine aircraft, shall be accomplished by requesting such flights to, if practicable:

(1) Maintain a specified speed equivalent to that of the preceding/succeeding aircraft; or

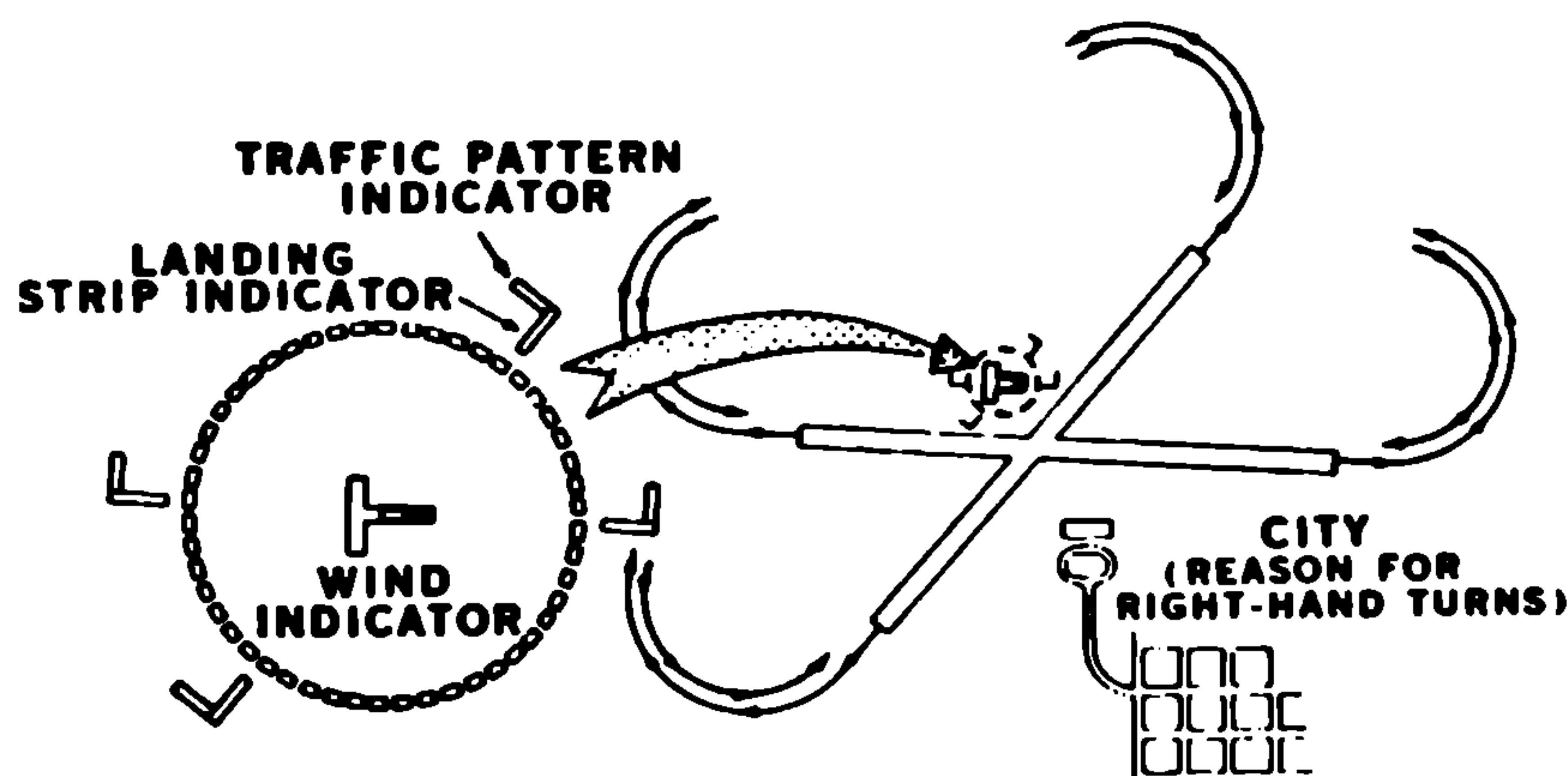
(2) Increase or decrease speed utilizing increments of 10 knots or multiples thereof.

2. The pilots retain the prerogative of rejecting the application of speed adjustment by ATC, if in his opinion, it will adversely affect the operating characteristics of the aircraft. In such cases, the pilot is expected to advise ATC of the speed that will be used.

## LANDING

### TRAFFIC PATTERN DIRECTION

1. The segmented circle system consists of the following components: A wind indicator (sock) will be found at the center of the circle. Associated with the wind indicator and also located at the center of the circle, is the landing direction indicator, which may be a tetrahedron or tee, either free swinging or set for a particular runway. Although appearing as a single unit, the L-shaped indicator located at various positions around the segmented circle or at the end of a runway actually consists of two parts. That portion of the L in alignment with or parallel to a runway is known as the landing strip indicator. The other section of the L running at a right angle to the runway is known as the traffic pattern indicator.



2. Preparatory to a landing, the pilot should concern himself with the indicator for the approach end of the runway to be used. If the pilot will mentally enlarge the indicator for the runway to be used, the base and final approach legs of the traffic pattern to be flown immediately become apparent. Similar treatment of the indicator at the departure end of the runway will clearly indicate the direction of turn to join the cross wind leg of the traffic pattern after takeoff.

3. A flashing amber light in the center of the segmented circle or on top the control tower or adjoining building indicates clockwise flow of traffic is in effect at that time and that right turns shall be made unless otherwise authorized by Air Traffic Control.

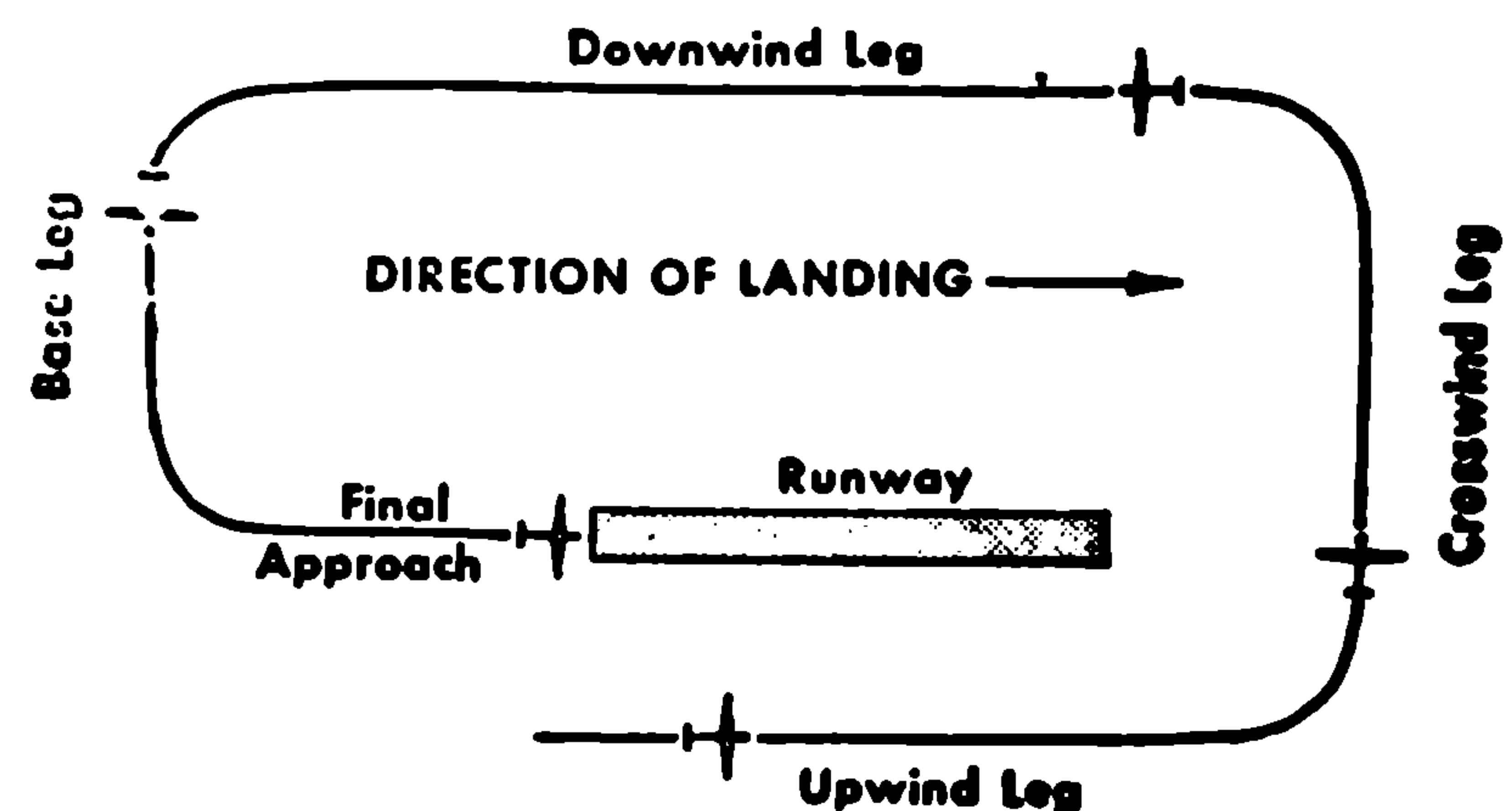
4. Right hand flow of traffic may also be shown by indi-

cators located at either the segmented circle or ends of the runway. A pilot may determine the direction of traffic flow by circling the airport at an altitude above the airport traffic area.

5. At airports where traffic control is exercised by a control tower, traffic and taxi patterns have been established to specify the desired flow of ground and air traffic operating on and in the vicinity of an airport. If the traffic pattern is not known, follow other traffic unless otherwise advised. Control tower operators issue clearances or other information to pilots as necessary for aircraft to generally follow the desired flight path (traffic patterns) when flying the airport traffic area/control zone and the proper taxi routes (taxi patterns) when operating on the ground.

6. The following terminology for the various components of a traffic pattern has been adopted as standard for use by control towers and pilots:

### STANDARD TRAFFIC PATTERN COMPONENTS



**Upwind leg**—A flight path parallel to the landing runway in the direction of landing.

**Crosswind leg**—A flight path at right angles to the landing runway off its upwind leg.

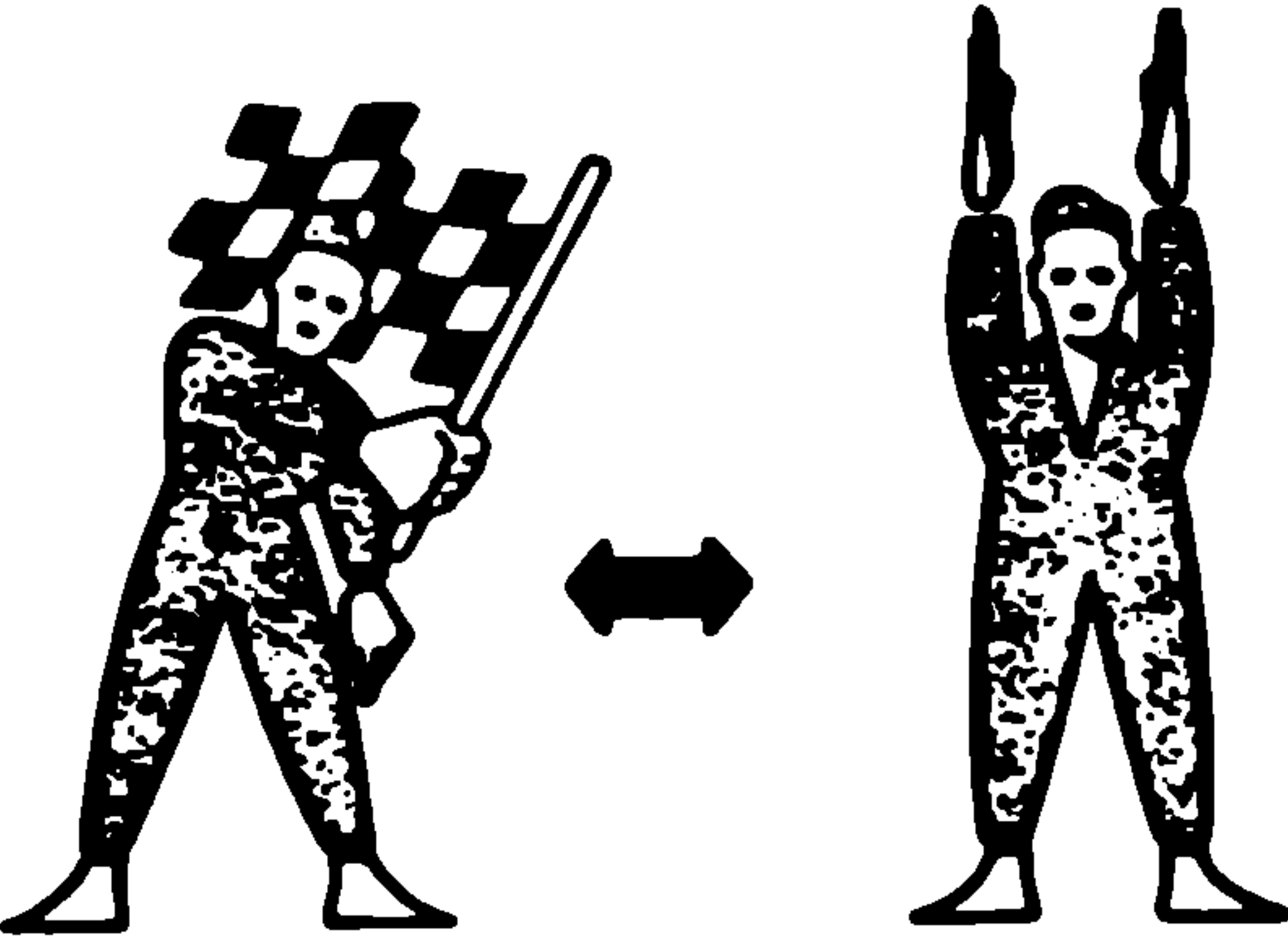
**Downwind leg**—A flight path parallel to the landing runway in the direction opposite to landing.

**Base leg**—A flight path at right angles to the landing runway off its approach end and extending from the downwind leg to the intersection of the extended runway center line.

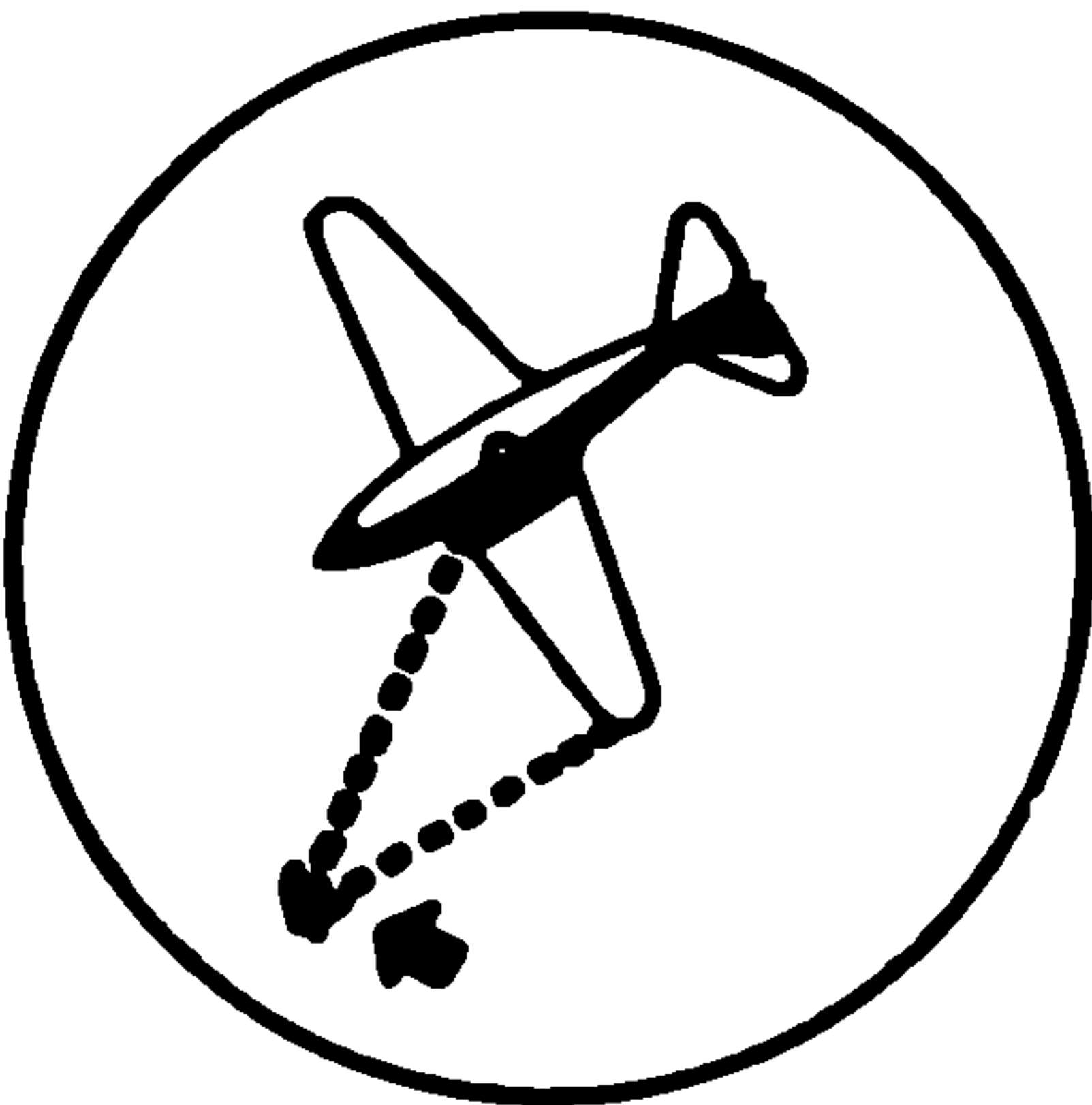
**Final approach**—A flight path in the direction of landing along the extended runway center line from the base leg to the runway.



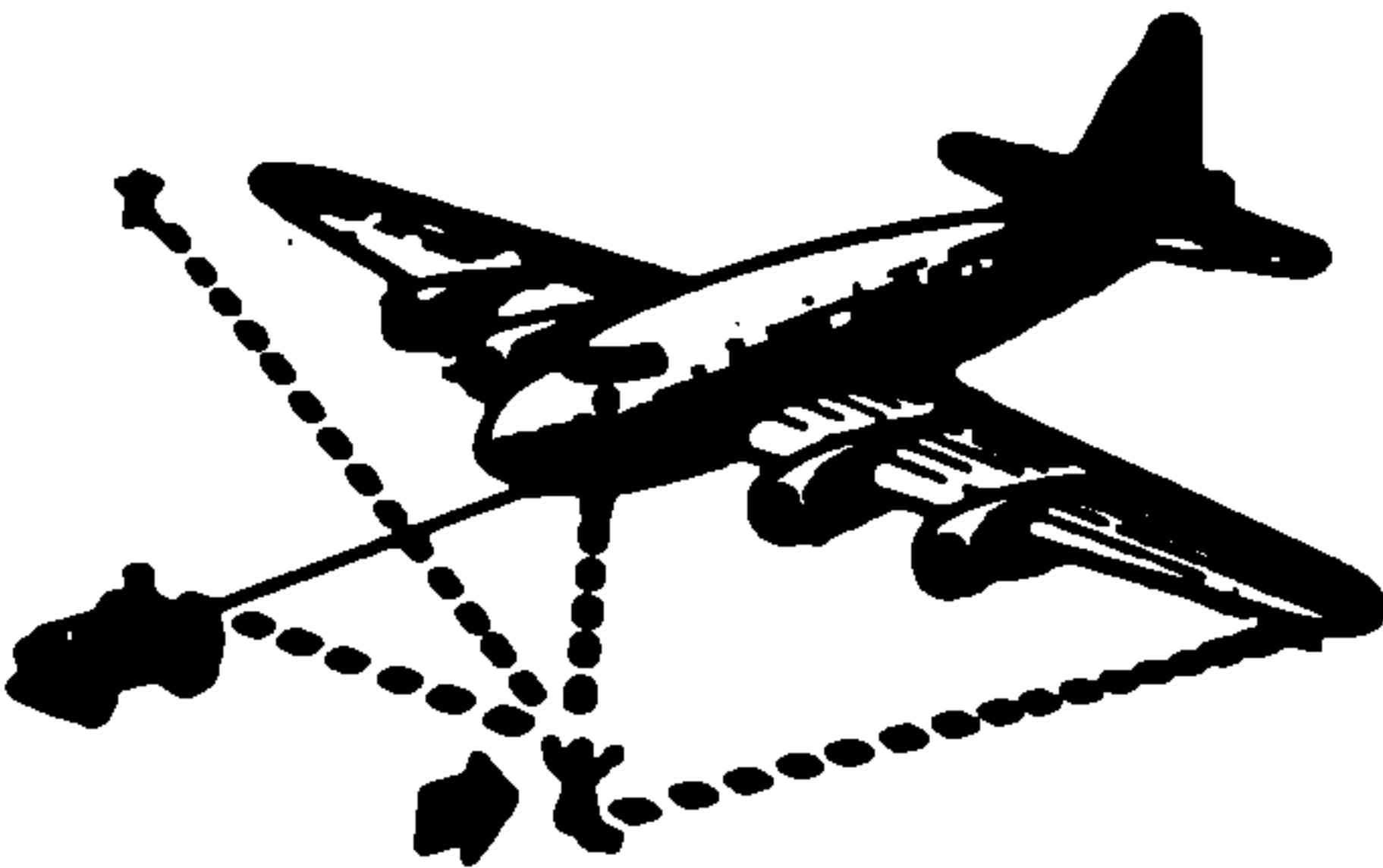
### HAND SIGNALS






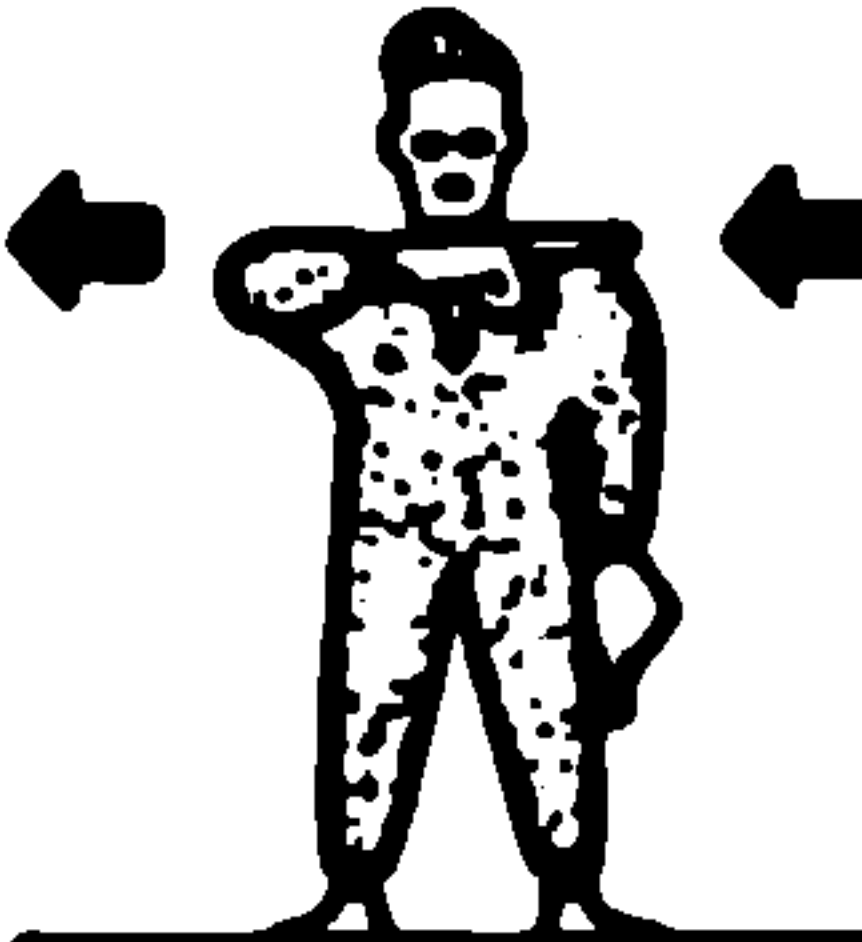

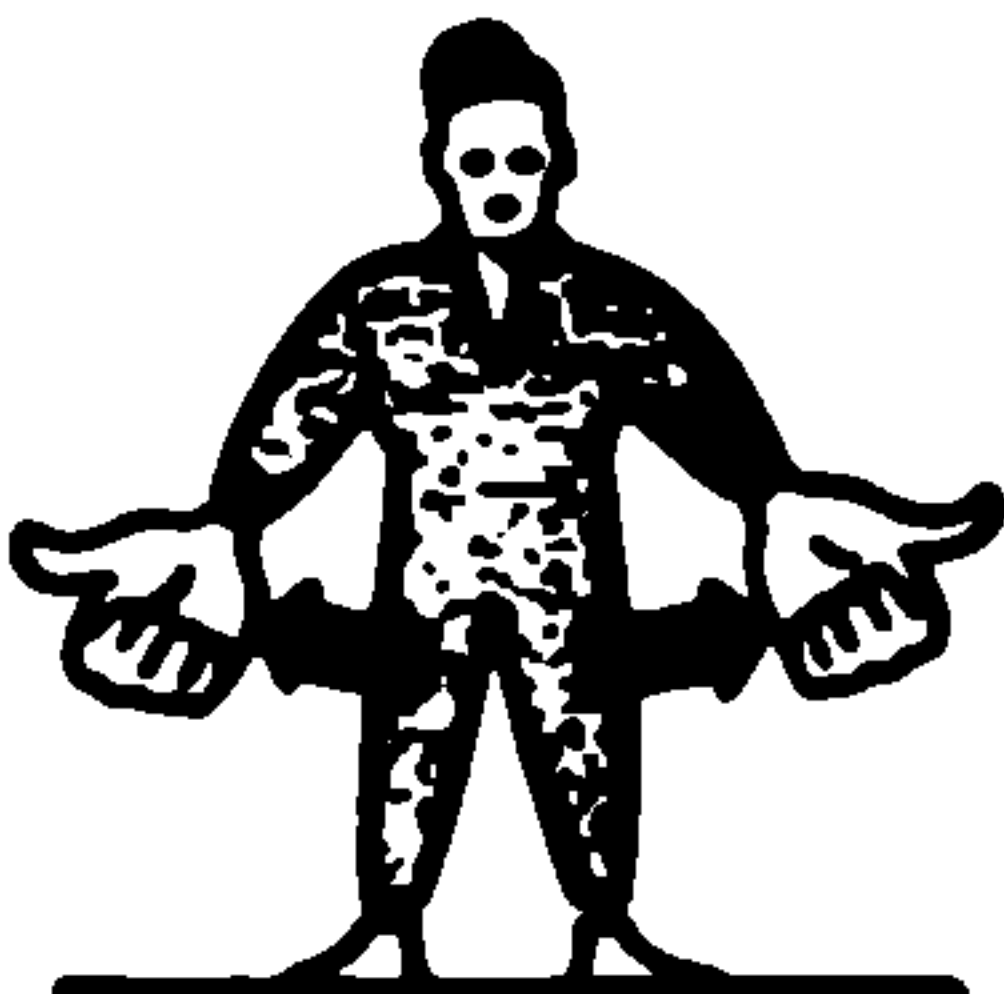
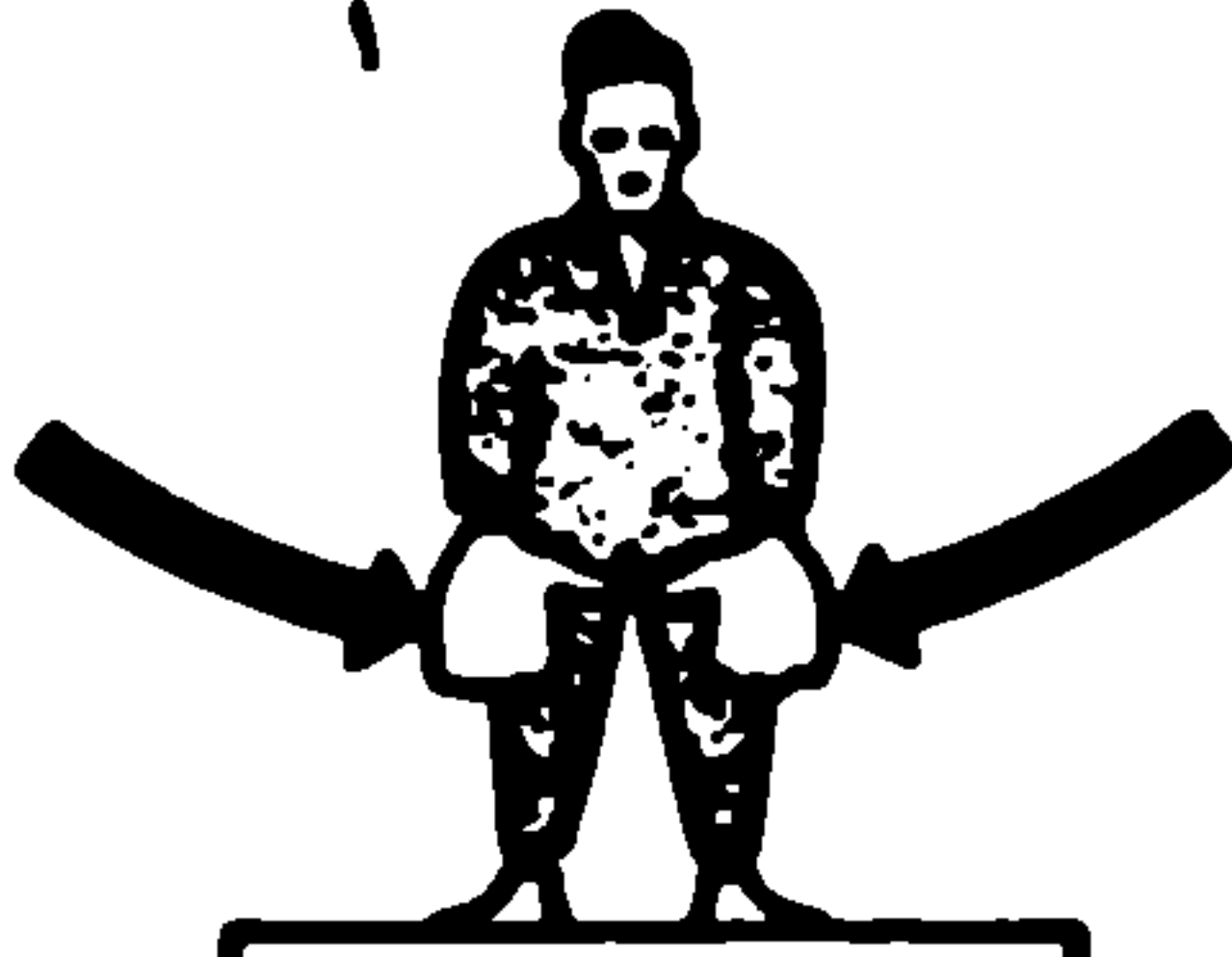
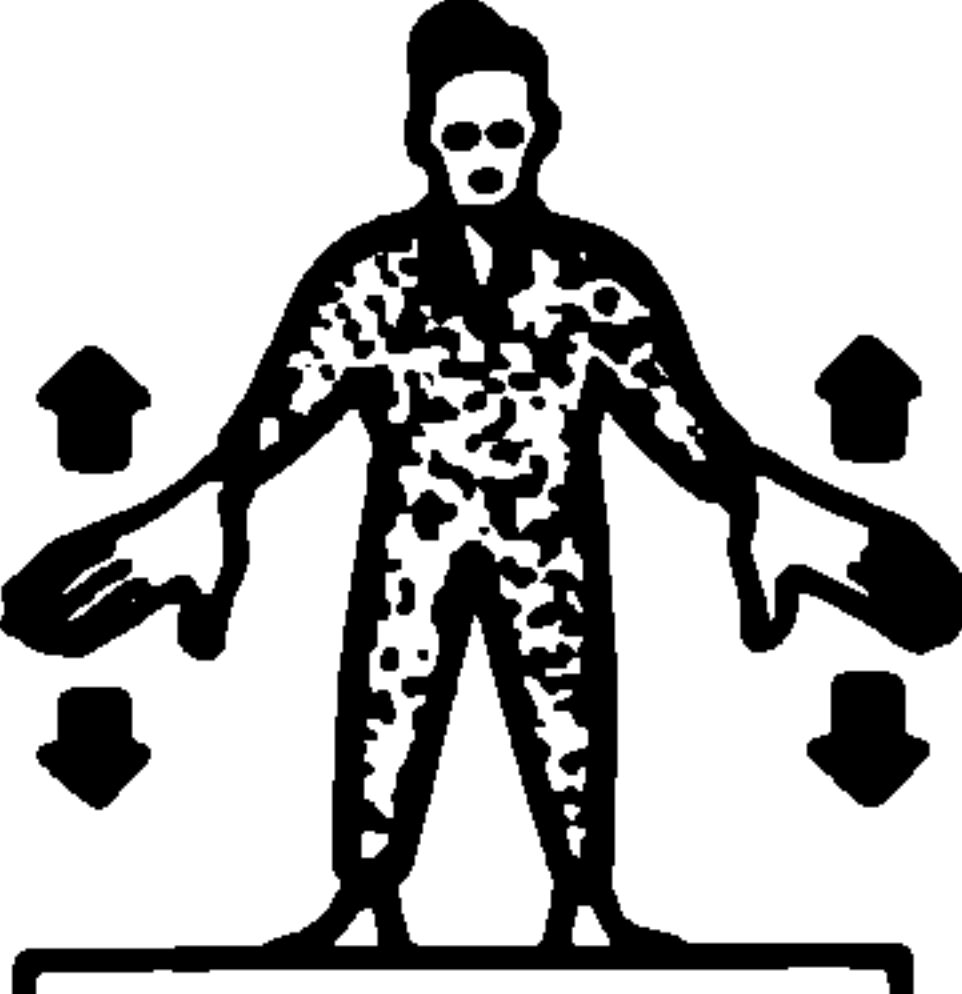




FLAGMAN DIRECTS PILOT TO SIGNALMAN'S POSITION IF TRAFFIC CONDITIONS REQUIRE



SIGNALMAN'S POSITION



SIGNALMAN DIRECTS TOWING

 <p>STOP</p>	 <p>COME AHEAD</p>	 <p>EMERGENCY STOP</p>	 <p>CUT ENGINES</p>
 <p>START ENGINES</p>	 <p>PULL CHOCKS</p>	 <p>INSERT CHOCKS</p>	 <p>SLOW DOWN</p>
 <p>ALL CLEAR (OK)</p>	 <p>LEFT TURN</p>	 <p>RIGHT TURN</p>	 <p>NIGHT OPERATION</p>



## GENERAL

### U.S. ENTRY AND DEPARTURE REQUIREMENTS

#### 1. GENERAL

a. Air Commerce Regulations of the United States Part 6, place certain responsibilities upon owners and operators of aircraft engaging in flight to/from foreign countries.

b. Customs, and the other agencies concerned, desire to facilitate air travel to the fullest extent possible while carrying out their responsibilities. Plane operators can assist greatly by familiarizing themselves with the regulations and by complying with them under all circumstances. Failure to do so may incur substantial penalties.

c. The following sets forth principal requirements of concern to private plane operators engaging in international flights.

#### 2. ARRIVAL AND DEPARTURE MANIFESTS

a. All aircraft departing from the continental United States or Alaska for Canada or the French Islands of St. Pierre or Miquelon are exempt from filing an arrival or departure manifest. Aircraft arriving from any other place are required to file arrival and departure manifests. However, the Immigration and Naturalization Service does not inquire private aircraft not carrying passengers for hire to file an arrival or departure manifest when arriving from or departing for Mexico.

b. The waiver of passengers manifested does not exempt the aircraft from inspection requirements on arrival from foreign ports.

#### 3. ADVANCE NOTICE REQUIRED

a. Advance notice of each arrival must be furnished U.S. Customs officials at or nearest the place of intended first landing who will notify the Immigration and Public Health Service is required for entry to the Virgin Islands.

b. Advance notice should be sent so as to be received in sufficient time to enable the officers designated to inspect the aircraft to reach the place of landing before arrival of the aircraft. At those airports where full time customs service is not available, *at least one hour advance notice is required for this purpose.*

c. Notification may be made by telephone, which is preferable, by telegram or by radio. The notice should specify the following: (1) Type of aircraft; (2) Identification; (3) Name of pilot; (4) Place of last departure; (5) Airport of entry; (6) Number of alien and citizen passengers, and (7) estimated time of arrival. (Indicating whether C.S.T., E.S.T., etc.) Private aircraft arriving from Canada or Mexico may request that advance notice of arrival to customs officers be included in the *flight plan* filed in those countries if destined to an airport in the U.S. where flight notification service is available. At a landing rights airport such notices will then be treated as applications for permission to land.

d. Aircraft may use the following method of notifying customs when departing from a country or remote area where a pre-departure flight plan cannot be filed or an "advise customs" message cannot be included in a pre-departure flight plan. Call the nearest domestic or international FAA Flight Service Station as soon as it is estimated that radio communications can be established and file a VFR (DVFR) flight plan and include as the last item "advise customs." The station with which such a flight plan is filed will forward it to the appropriate FAA station who will notify the customs office responsible for the destination airport.

e. If the pilot fails to include "advise customs" in the radioed flight plan, it will be assumed that he has made other arrangements and FAA *will not* advise customs.

f. FAA assumes no responsibility for any delays in advising customs if the flight plan is given to FAA too late for delivery to customs before arrival of the aircraft. FAA cannot relay an "advise customs" flight plan if the pilot indicates a destination airport where flight service notice to customs is NOT available.

#### 4. AIRPORTS FOR ENTRY AND REENTRY

a. If the operator of a private aircraft returning to or visiting the United States wishes to *land at any airport of entry, advance notice of arrival is necessary.* This advance notice should be sent also to the immigration and public health officers at or nearest the intended place of first landing.

b. If he intends to land at a place *not designated as an airport of entry, he must obtain permission to make such landing, and give advance notice of arrival* to the customs office nearest the intended place of first landing. It is not necessary that separate requests be sent to immigration and public health officers in these cases.

c. *What to report*—The advance notice should specify the type of aircraft, registration marks, name of commander, place of last departure, international airport, number of alien passengers, number of citizen passengers, and the estimated time of arrival. *This advance notice should be sent in time to enable officers designated to inspect the aircraft to reach the place of landing before the plane arrives.*

d. Upon arrival, the operator and passengers will be examined in the same manner as any international traveler. They must declare any articles acquired aboard. If passengers or cargo are carried for hire, an inward manifest must be filed. Customs officers will supply forms for both types of declarations.

#### 5. EMERGENCY

If an emergency landing is made in the United States, the plane operator should report as promptly as possible to the nearest customs, immigration, and public health officers. He should not permit any merchandise or baggage to be removed, or any passengers to depart without



**U.S. ENTRY AND DEPARTURE (Con't)**

official permission unless necessary for preservation of life or property.

**6. CHARGES**

a. No charges are made for services during business hours *when a landing takes place at any airport of entry: except* that, when an aircraft arrives on Sunday or holiday, or during other than regular hours, **OVERTIME PAY WILL BE COLLECTIBLE**. These charges are required by law. They may amount to as much as two days' pay for each officer for any services performed on a Sunday or holiday. However, the charges are prorated where more than one aircraft is processed.

b. *If the landing is made at a place other than an airport of entry*, any expenses incurred by Government officers in going to and from the place of landing are payable by the plane operator. In addition, if the aircraft arrives on a Sunday or holiday, or during other than regular hours, **OVERTIME PAY WILL BE COLLECTIBLE**.

**7. TRANSBORDER FLIGHTS TO CANADA**

a. Customs regulations allow the clearance by telephone of private aircraft departing for Canada and not carrying cargo.

b. If not carrying cargo, passengers for hire, nor departing to pick up passengers for hire at points in Canada, a private aircraft departing for Canada does not require a clearance of any type.

c. If carrying passengers for hire or departing to pick up passengers for hire at points in Canada and not carrying cargo, approval of clearance may be applied for by telephone when consideration of distance and expense or, in an emergency, time are present.

d. For Buffalo-Niagara area apply to the supervisory inspector at the Peace Bridge at Buffalo or to the supervisory inspector at the Rainbow Bridge at Niagara Falls. The telephone number at the Peace Bridge is GRant 1180 and at the Rainbow Bridge BUtler 2-4562. When approval of the clearance is obtained from the Peace Bridge, the general outward declaration should be mailed to United States Customs, Peace Bridge, Buffalo, New York. Similarly, when approval of clearance is obtained from the Rainbow Bridge, the general outward declaration should be mailed to United States Customs, Rainbow Bridge, Niagara Falls, New York.

e. Complete details are included in the International Flight Information Manual which can be obtained from Supt. of Documents, Government Printing Office, Wash., D.C. 20402.

**8. AIRPORTS OF ENTRY**

a. Any aircraft may land at one of the following airports and permission to land from U.S. Customs is not required. However, advance notice of arrival must be furnished to U.S. Customs. This may be included in your *flight plan* filed in Canada or Mexico if destined to an airport where flight notification service is available.

**Alaska**

Juneau/Juneau SPB  
Juneau/Juneau Mun  
Ketchikan/Ellis Airlines SPB

**Arizona**

Douglas/Bisbee-Douglas Arpt  
Tucson/Tucson Intl  
Nogales/Nogales Intl  
Yuma/Yuma Intl

**California**

Calexico/Calexico Mun  
San Diego/San Diego Mun (Lindbergh Fld)

**Florida**

Fort Lauderdale/Ft. Lauderdale-Hollywood Intl  
Key West/Key West Intl  
Miami/Miami Intl  
Miami/Chalk SPB  
Tampa/Tampa Intl  
West Palm Beach/Palm Beach Intl

**Illinois**

Chicago/Chicago Midway

**Maine**

Caribou/Caribou Mun

**Michigan**

Detroit/Detroit Mun  
Detroit/Detroit Metropolitan Wayne County  
Port Huron/St Clair County Arpt  
Saulte Ste Marie/Saulte Ste Marie Mun

**Minnesota**

Baudette/Baudette Mun  
Duluth/Duluth Intl  
Duluth/Sky Harbor Arpt  
International Falls/Falls Intl  
Rainer/Intl SPB

**Montana**

Cut Bank/Cut Bank Arpt  
Great Falls/Great Falls Intl  
Havre/Havre City County Arpt

**New York**

Albany/Albany County  
Buffalo/Greater Buffalo Intl

**•Malone**

†Massena/Richards Fld  
Ogdensburg/Ogdensburg Mun  
Rochester/Monroe County  
Rouses Point/Rouses Point SPB  
†Watertown/Watertown Mun

**North Dakota**

Grand Forks/Grand Forks Intl  
Minot/Minot Intl  
Pembina/Pembina Mun  
Portal/Portal Mun Arpt  
Williston/Sioulin Fld

**Ohio**

Akron/Mun Arpt  
Cleveland/Cleveland Hopkins Arpt  
\*Put-In-Bay/Put-In-Bay Arpt



**U.S. ENTRY AND DEPARTURE (Con't)****Texas**

Brownsville/Rio Grande Valley Intl  
 Del Rio/Del Rio Intl.  
 \*Eagle Pass/Eagle Pass Arpt  
 El Paso/El Paso Intl  
 Laredo/Laredo Intl  
 McAllen/Miller Intl

**Vermont**

Burlington/Burlington Mun

**Washington**

Bellingham/Bellingham Mun  
 Friday Harbor/Friday Harbor SPB  
 Oroville/Dorothy Scott  
 Port Townsend/Port Townsend-City-County  
 Seattle/Boeing Fld  
 Seattle/Lake Union Air Service (Seaplanes)  
 Spokane/Felts Fld

\* Indicates Flight Service notification to U.S. Customs not available. Flight notification service available to all airports not so marked for private flights from Canada to Mexico.

† Indicates U.S. Public Health Service inspection not available.

**9. LANDING RIGHTS AIRPORTS**

a. At the following airports an application for permission to land must be submitted in advance to U.S. customs. Advance notice of arrival must also be furnished to U.S. Customs. Advance notice of arrival may be included in your flight plan filed in Canada or Mexico if destined to an airport where flight notification service is available and this notice will be treated as an application for permission to land.

**Alabama**

Mobile/Bates Fld

**Alaska**

Anchorage/Anchorage Intl  
 Annette/Annette Island Arpt  
 ††Fairbanks/Fairbanks Intl  
 \*†Fort Yukon/Fort Yukon Mun  
 \*†Haines/Mun Arpt  
 †Northway/FAA Fld  
 †Petersburg SPB  
 †Sitka SPB  
 \*†Skagway/Skagway Mun

**California**

Los Angeles/Los Angeles Intl  
 San Francisco/San Francisco Intl

**Colorado**

\*Denver/Stapleton Fld

**Connecticut**

\*Groton/Trumbull Arpt  
 Hartford/Brainard Fld  
 \*New Haven/New Haven Mun  
 \*Stratford (Bridgeport)/Bridgeport Mun  
 Windsor Locks/Bradley Fld

**District of Columbia**

Washington/Dulles Intl

**Florida**

Jacksonville/Imeson Mun  
 St. Petersburg/Clearwater Intl

**Hawaii**

Honolulu/Honolulu Intl

**Idaho**

\*†Porthill/SPB

**Illinois**

Chicago/O'Hare Intl  
 Chicago/Meigs Fld

**Louisiana**

New Orleans/New Orleans Intl (Molsant Fld)

**Maine**

Bar Harbor/Bar Harbor Arpt  
 \*Eastport/Eastport Mun  
 Houlton/Houlton Mun  
 \*Jackman/Jackman Mun (Newton Fld)  
 Portland/Portland Mun

**Maryland**

Baltimore/Friendship Intl

**Massachusetts**

Bedford/Hanscom Fld  
 \*Beverly/Beverly Mun  
 Boston/Logan Intl  
 \*Lawrence/Lawrence Mun  
 \*New Bedford/New Bedford Mun  
 \*Westfield/Barnes Arpt  
 Worcester/Worcester Mun

**Michigan**

\*†Alpena/Phelps-Collins Arpt  
 \*Bay City/James Clements Mun  
 †Houghton/Houghton County Mem  
 †Marquette/County Arpt  
 †Pellston/Emmet County Arpt (Marine Customs available Apr thru Sept, other times emerg only.)  
 Port Huron/Baker's Fld

**Minnesota**

\*†Crane Lake/Mohr and Handberg's Base  
 \*†Ely/Leithold SPB  
 Minneapolis/Minneapolis-St. Paul Intl  
 (Wold Chamberlain)  
 \*†Pinecreek/Pinecreek Arpt  
 \*†Warroad/Warroad Mun

**Montana**

\*†Scobey/State County Arpt

**Nebraska**

†Omaha/Eppley Airfield

**New Jersey**

Newark/Newark Arpt

**New Mexico**

Columbus/Columbus Arpt



**U.S. ENTRY AND DEPARTURE (Con't)****New York**

New York/La Guardia Arpt  
 New York/John F. Kennedy  
 Niagara Falls/Niagara Falls  
 Point Pleasant/Point Pleasant SPB  
 \*Rochester/Glen Haven SPB  
 \*Rochester Fountair SPB  
 Syracuse/Hancock Arpt

**North Dakota**

\*Noonan/Border Arpt

**Ohio**

†Akron/Akron-Canton Arpt  
 Cincinnati/Lunken Fld  
 Cleveland/Burke Lakefront SPB  
 †Kent/Kent Arpt  
 Toledo/Toledo Express Arpt  
 Toledo/National Arpt

**Oregon**

Portland/Portland Intl

**Pennsylvania**

Erie/Port Erie Arpt  
 Philadelphia/Philadelphia Intl  
 Pittsburgh/Greater Pittsburgh Arpt

**Puerto Rico**

San Juan/Puerto Rico Intl

**Rhode Island**

Providence/Theodore Francis Green Arpt

**South Carolina**

Charleston/Charleston Mun

**Texas**

Corpus Christi/Corpus Christi Intl Arpt  
 Dallas/Love Fld  
 Houston/Houston Intl  
 San Antonio/San Antonio Intl

**Vermont**

\*Newport/Newport Mun  
 \*Swanton/Warren R. Austin Arpt

**Virgin Islands**

St. Thomas/Harry S. Truman Arpt

**Virginia**

Norfolk/Norfolk Mun

**Washington**

•Laurier/Avey State Emerg Arpt  
 \*†Northport/James A. Lowry Arpt  
 \*Port Angeles/Clallam County Arpt  
 \*Port Angeles/Port Angeles Boat Haven  
 Port Townsend/Port Townsend Bay  
 Seattle/Seattle-Tacoma Intl  
 Spokane/Spokane Intl

**Wisconsin**

\*†Green Bay/Austin Straubel Arpt  
 Milwaukee/General Mitchell Fld

\*Indicates Flight Service notification to U.S. Customs not available. Flight notification service available to all airports not so marked.

†Indicates landing rights may be granted provided the aircraft is not subject to quarantine inspection by the U.S. Public Health Service. (Sec. 71.46, P.H.S. Foreign Quarantine Regulations.)

†† Free Customs service is available at the Fairbanks International Airport from 1800 GMT to 0300 GMT daily Monday thru Saturday upon PRIOR notice. Services for Holidays, Sundays, and AFTER business hours are subject to extra charges. ALL requests for Customs service must be made PRIOR to close of business hours.

**ADIZ PROCEDURES (F.A.R. PART 99)**

1. An "Airfiled" flight plan makes the aircraft subject to interception for positive identification. Pilots are strongly urged, therefore, to file DVFR Flight Plans required for Security Control either in person or by telephone. FAA Flight Service Stations will accept collect long distance telephone calls made for the purpose of filing required DVFR flight plans. The following procedures apply:

a. Contact the long distance telephone operator and place a collect, station-to-station call from "SECURITY PILOT (your last name)" to the FAA station.

b. When the FAA accepts the call, file your DVFR flight plan as expeditiously as possible.

2. Pilots should note that FAA stations will not accept collect calls from locations which are obviously much closer to another FAA station, neither will they accept calls which do not contain the key words "SECURITY PILOT (name)." In order to conserve government funds, FAA stations will not accept long distance collect calls from any pilot within the Defense Area. DVFR flight plans from such points will be accepted, however, if filed at no expense to the government.

ADIZ PROCEDURES (Con't)

ADIZ Operational Requirements, Abbreviated Form

	Southern Border Domestic ADIZ	Alaskan Domestic ADIZ	Coastal ADIZ	DEWIZ
Flight Plan.....	Required for northbound aircraft.	Required.....	Required.....	Required before take-off ETDP required. Exception permitted in Part 99.13
Functioning Two-way Radio.	Required except as stated in Part 99.1(c)	Required except as stated in Part 99.1(c)	Required except as stated in Part 99.1(c)	Required.
Recommended ADIZ Tolerances	Within 5 minutes of estimate and 10 nautical miles of course centerline.	Within 5 minutes of estimate and 10 nautical miles of course centerline.	Within 5 minutes of estimate and 20 nautical miles of course centerline.	Within 5 minutes of estimate and 20 nautical miles of course centerline.
Position Reports.....	Normal IFR reports or—VFR give ETP at least 15 minutes before penetration.	Normal IFR reports or—VFR give ETP at least 15 minutes before penetration.	Same as Domestic ADIZ or—inbound foreign aircraft initial report at least one hour from U.S.	Normal IFR reports or—VFR report prior to penetration. Correlation of ground filed data may be requested.

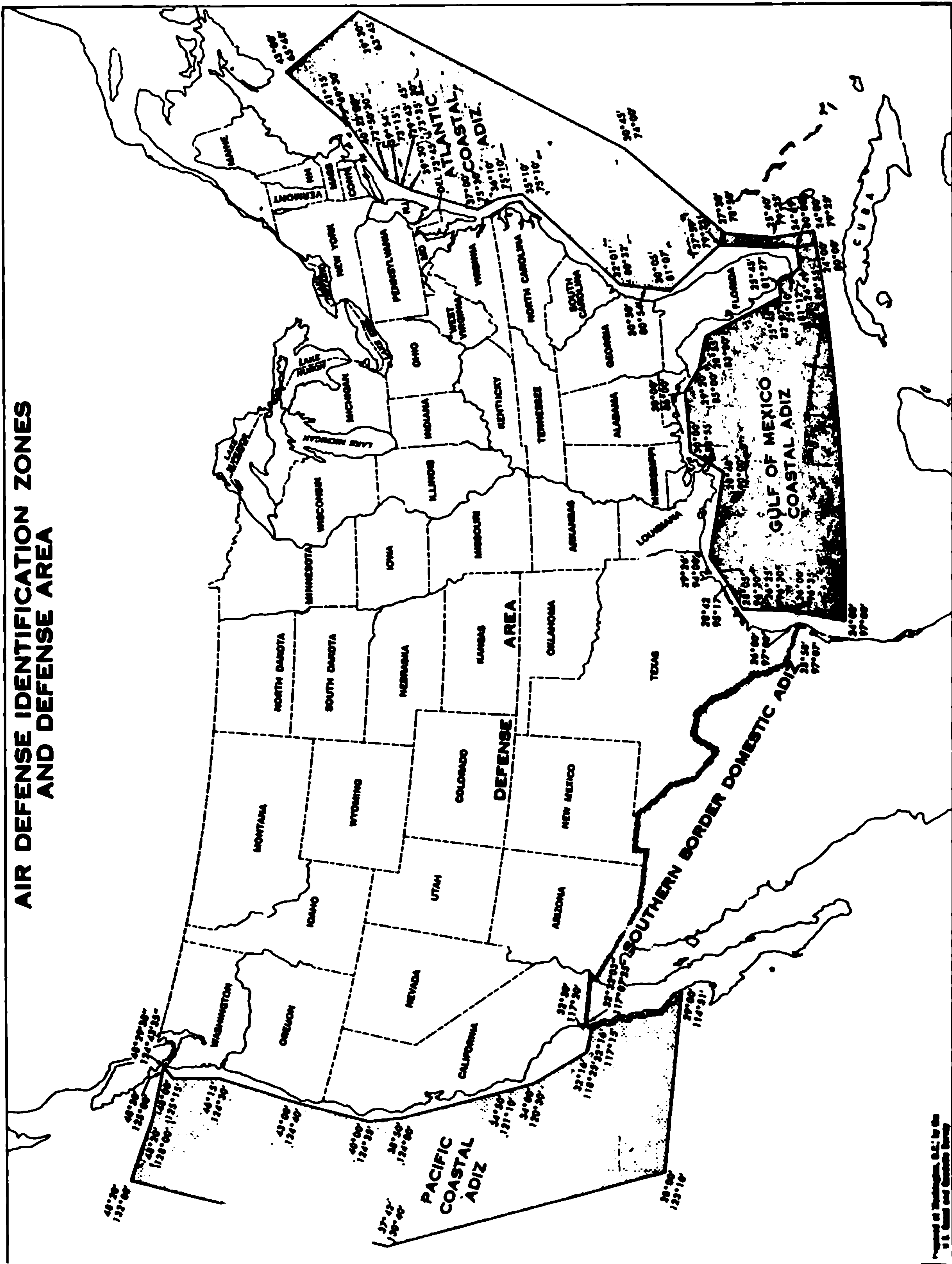
Air Defense Emergencies Part 99.7      ADDITIONAL SPECIAL SECURITY INSTRUCTIONS MAY BE ISSUED DURING DEFENSE EMERGENCY OR AIR DEFENSE EMERGENCY CONDITIONS.

Aircraft excepted from compliance to the provisions of Part 99 other than Part 99.7	Local exemptions granted by FAA ARTCC.	Local exemptions granted by FAA ARTCC.	Local exemptions granted by FAA ARTCC.	Local exemptions granted by FAA ARTCC.
	Aircraft remaining within 10 nautical miles of departure point within the Continental U.S.	Aircraft remaining within 10 nautical miles of departure point within the Continental U.S.	Aircraft remaining within 10 nautical miles of departure point within the Continental U.S.	Aircraft remaining within 10 nautical miles of departure point within the Continental U.S.
	Aircraft with TAS less than 180 knots.	Aircraft with TAS less than 180 knots.	Aircraft with TAS less than 180 knots, north of 28°N or west of 85°W.	Aircraft with TAS less than 180 knots—listening watch required.
	Aircraft from U.S. southbound through Southern Border ADIZ not entering Coastal ADIZ.		Flight over or within 3 nautical miles of any island in Hawaiian Coastal ADIZ.	

NOTE: Detailed procedures to be followed by the pilot are contained in Part 99, for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402



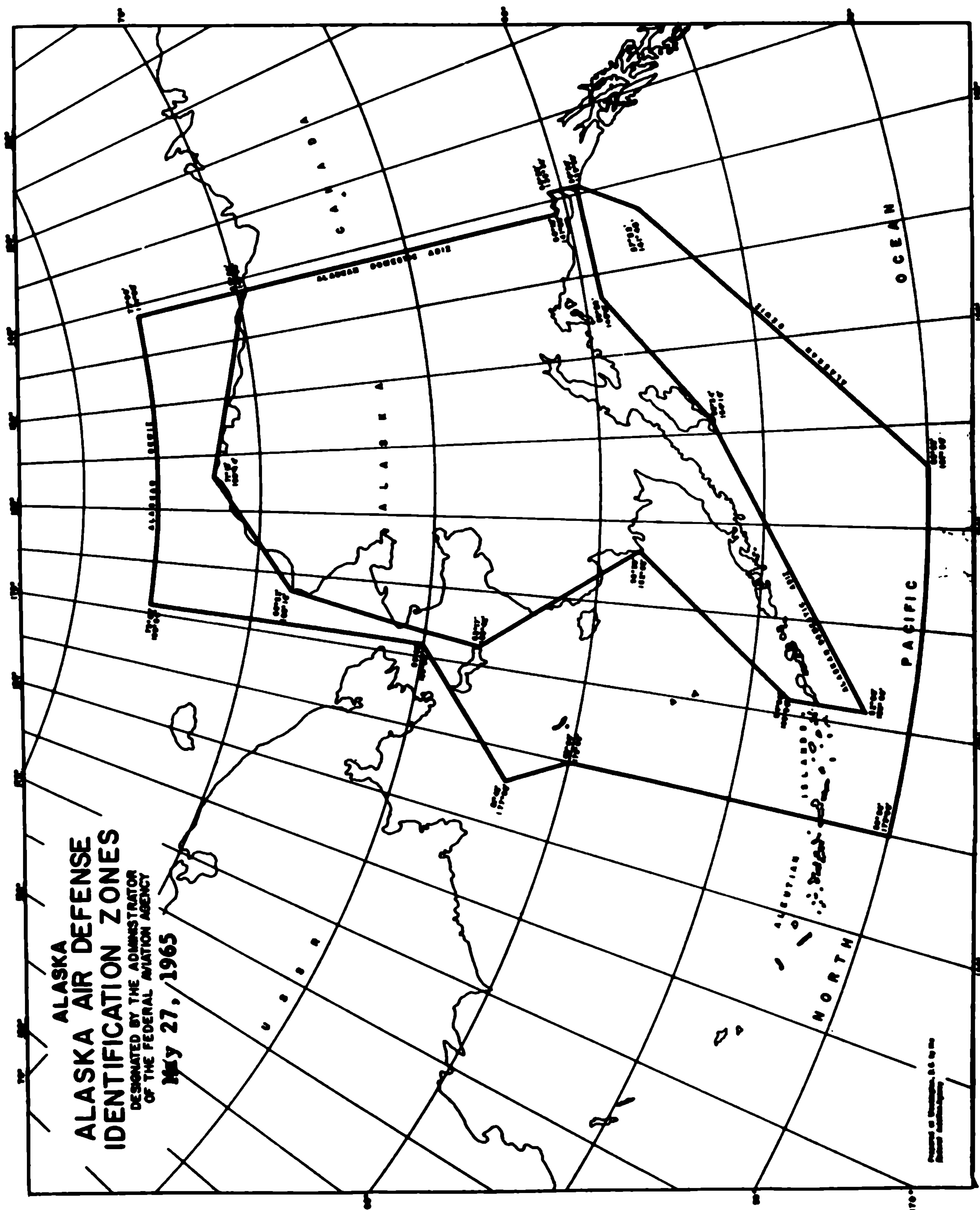
ADIZ PROCEDURES (Con't)



Revised at Washington, D.C. by the U.S. Civil and Military Survey

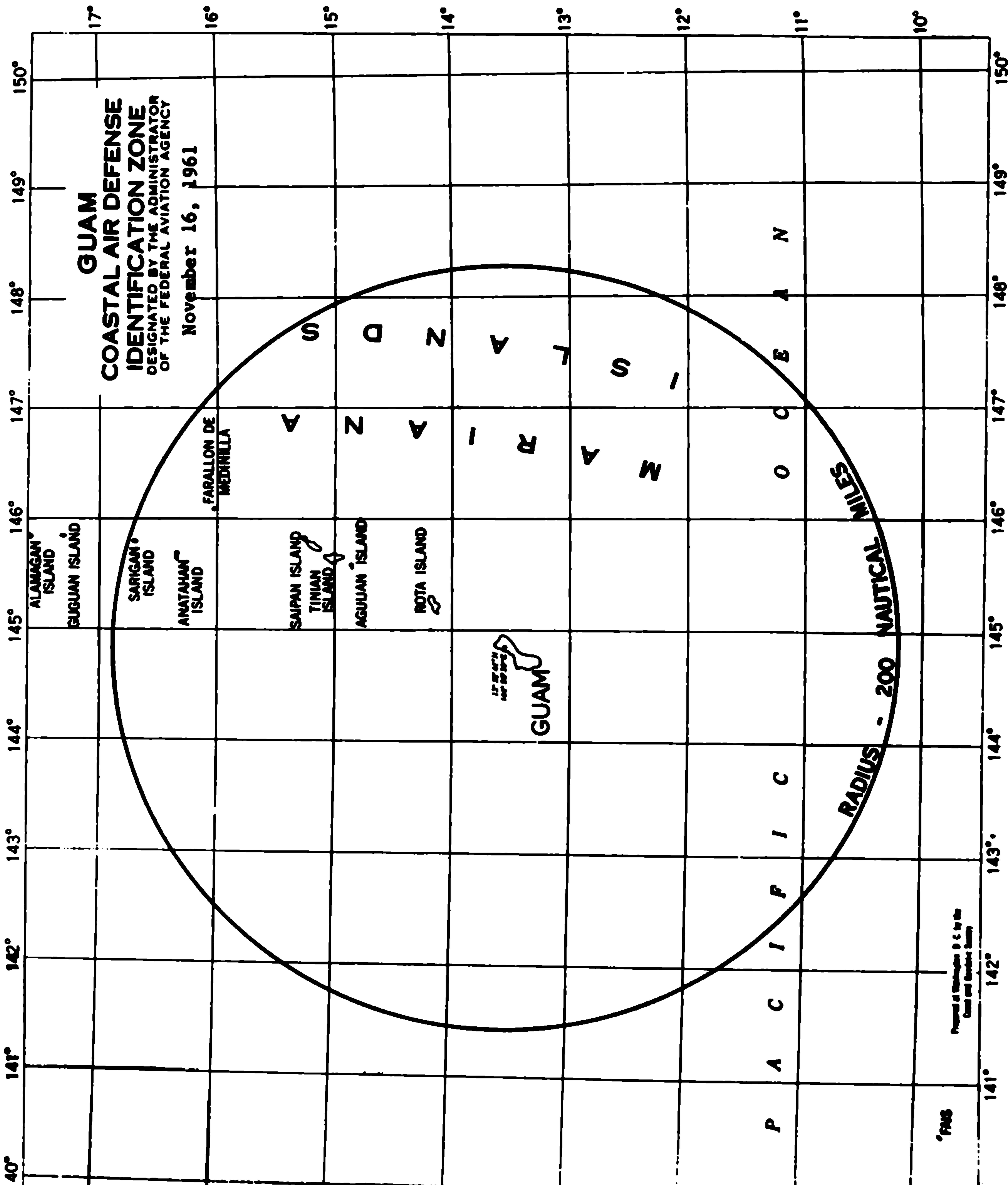


ADIZ PROCEDURES (Con't)



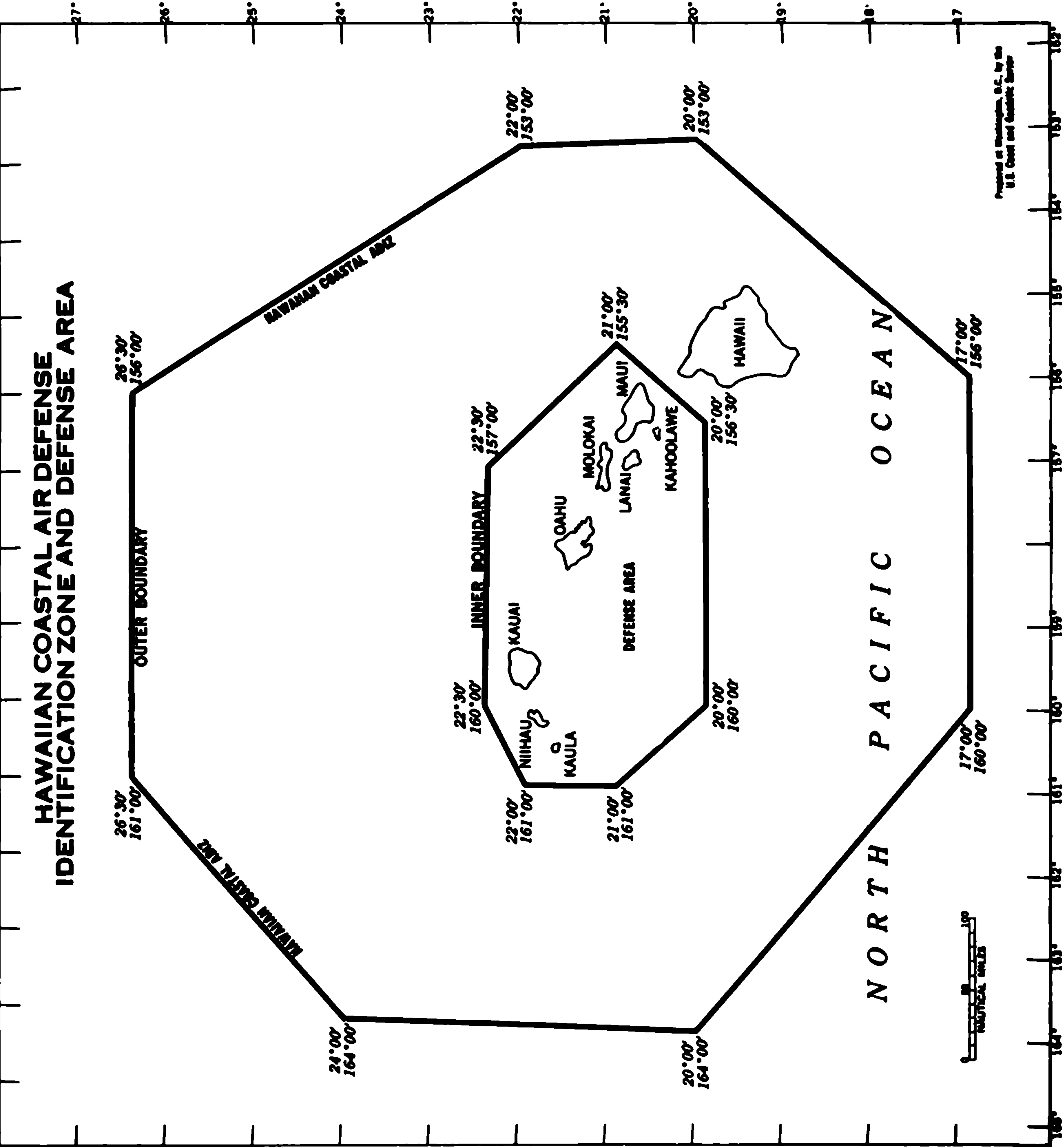


ADIZ PROCEDURES (Con't)





ADIZ PROCEDURES (Con't)

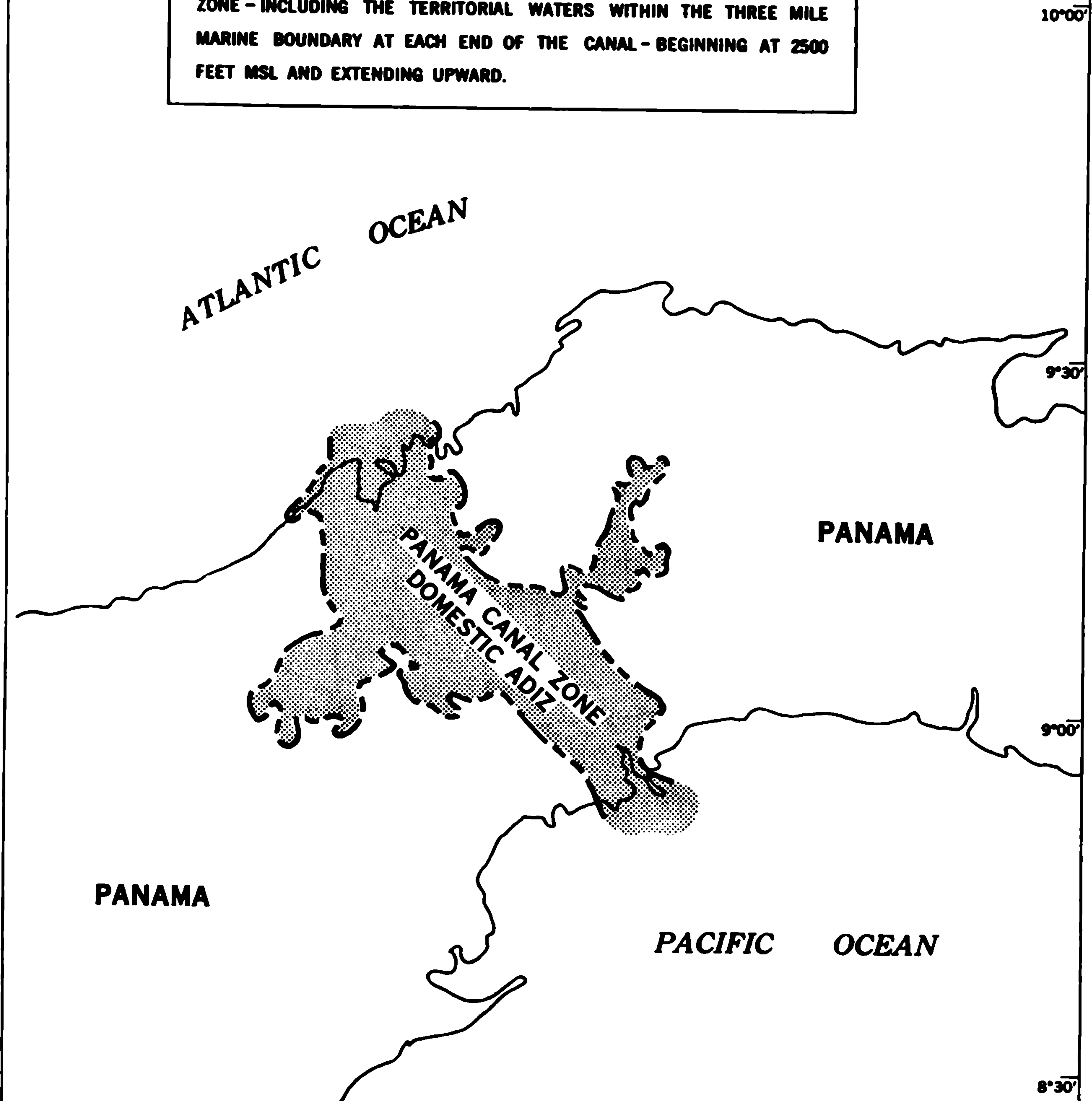




ADIZ PROCEDURES (Con't)

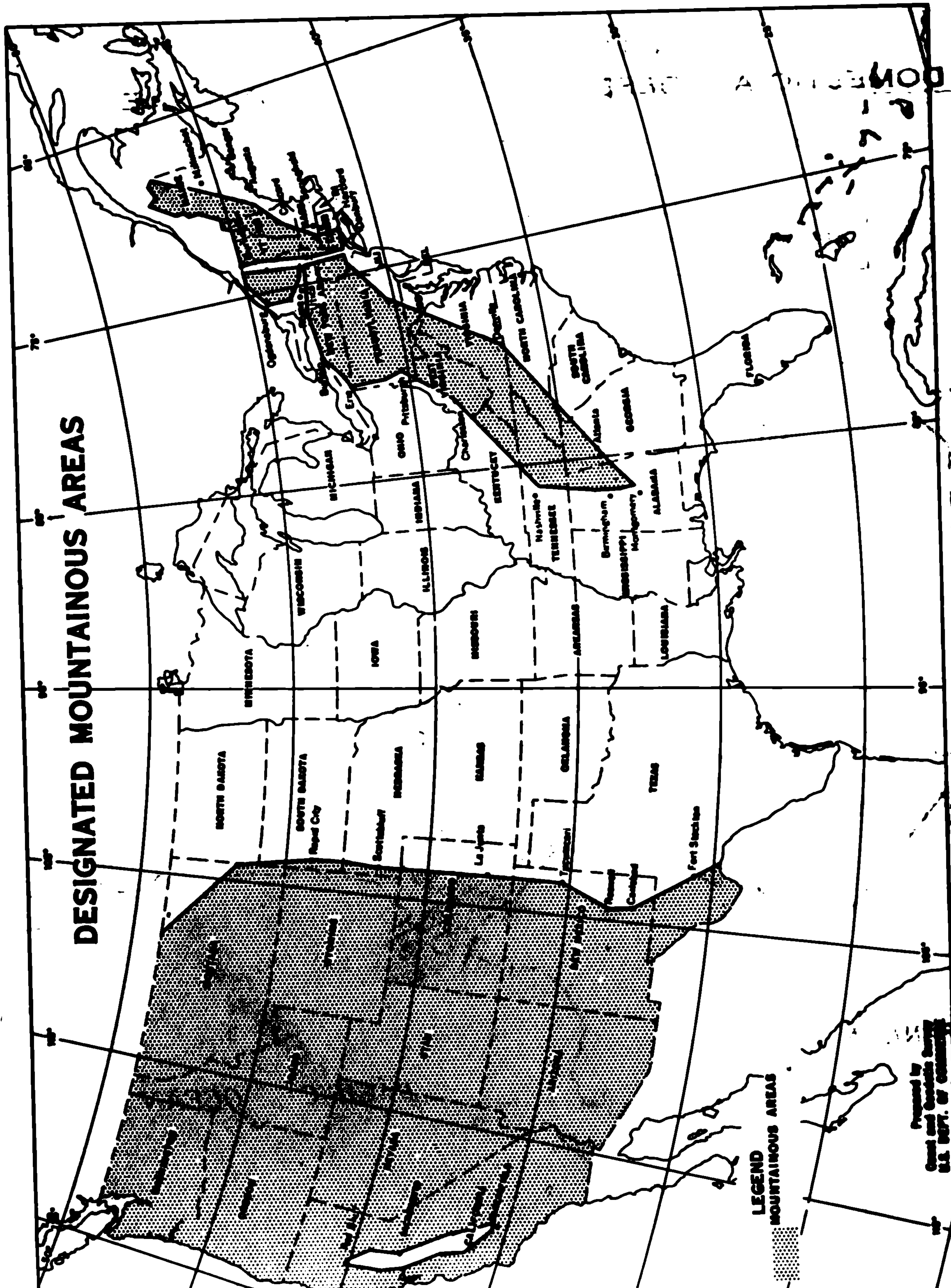
PANAMA CANAL ZONE  
DOMESTIC AIR DEFENSE IDENTIFICATION ZONE

PANAMA CANAL ZONE DOMESTIC ADIZ - THE AIRSPACE ABOVE THE CANAL ZONE - INCLUDING THE TERRITORIAL WATERS WITHIN THE THREE MILE MARINE BOUNDARY AT EACH END OF THE CANAL - BEGINNING AT 2500 FEET MSL AND EXTENDING UPWARD.





DESIGNATED MOUNTAINOUS AREAS

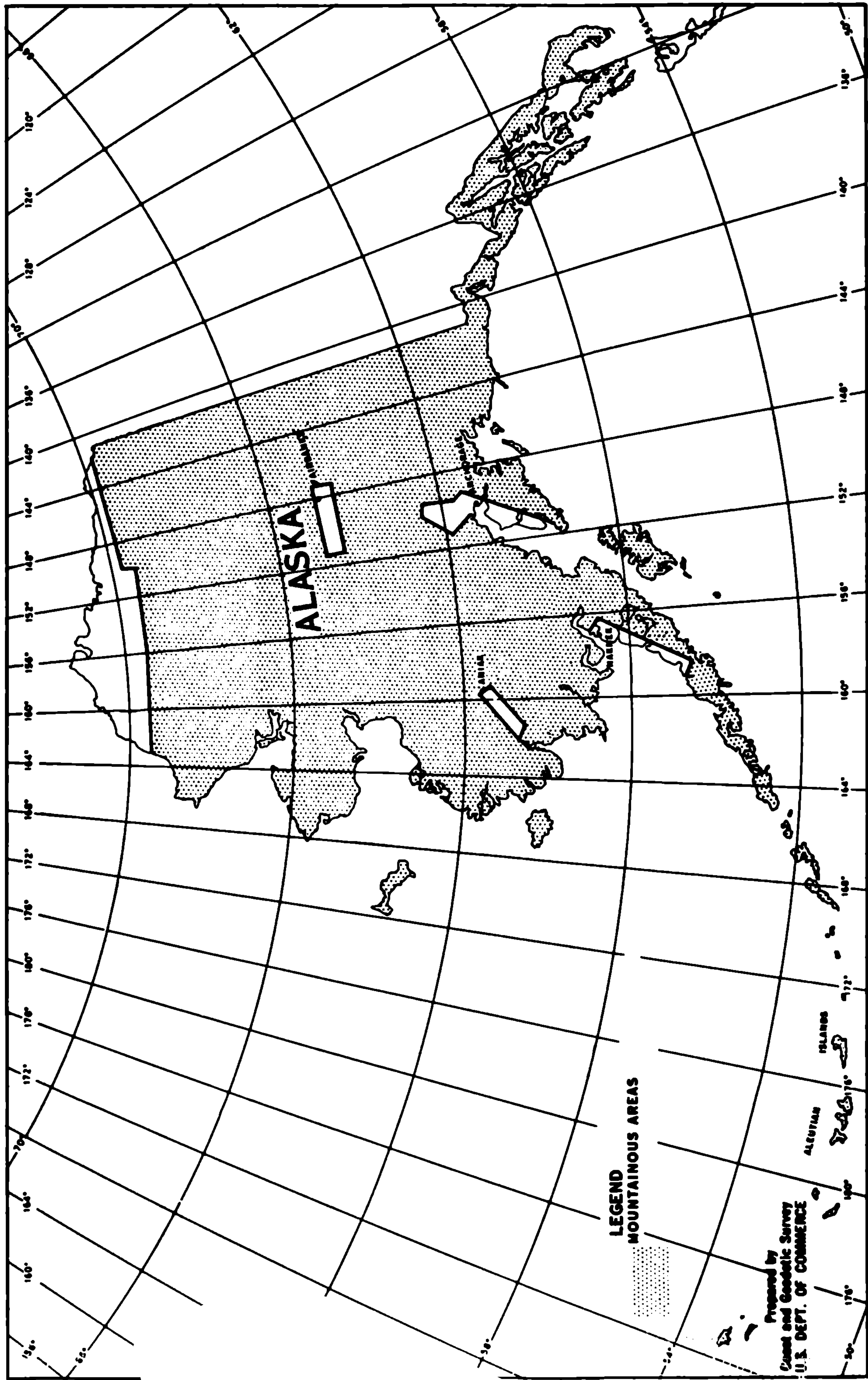


Prepared by  
Geodetic and Geomatics Branch  
U.S. DEPT. OF COMMERCE



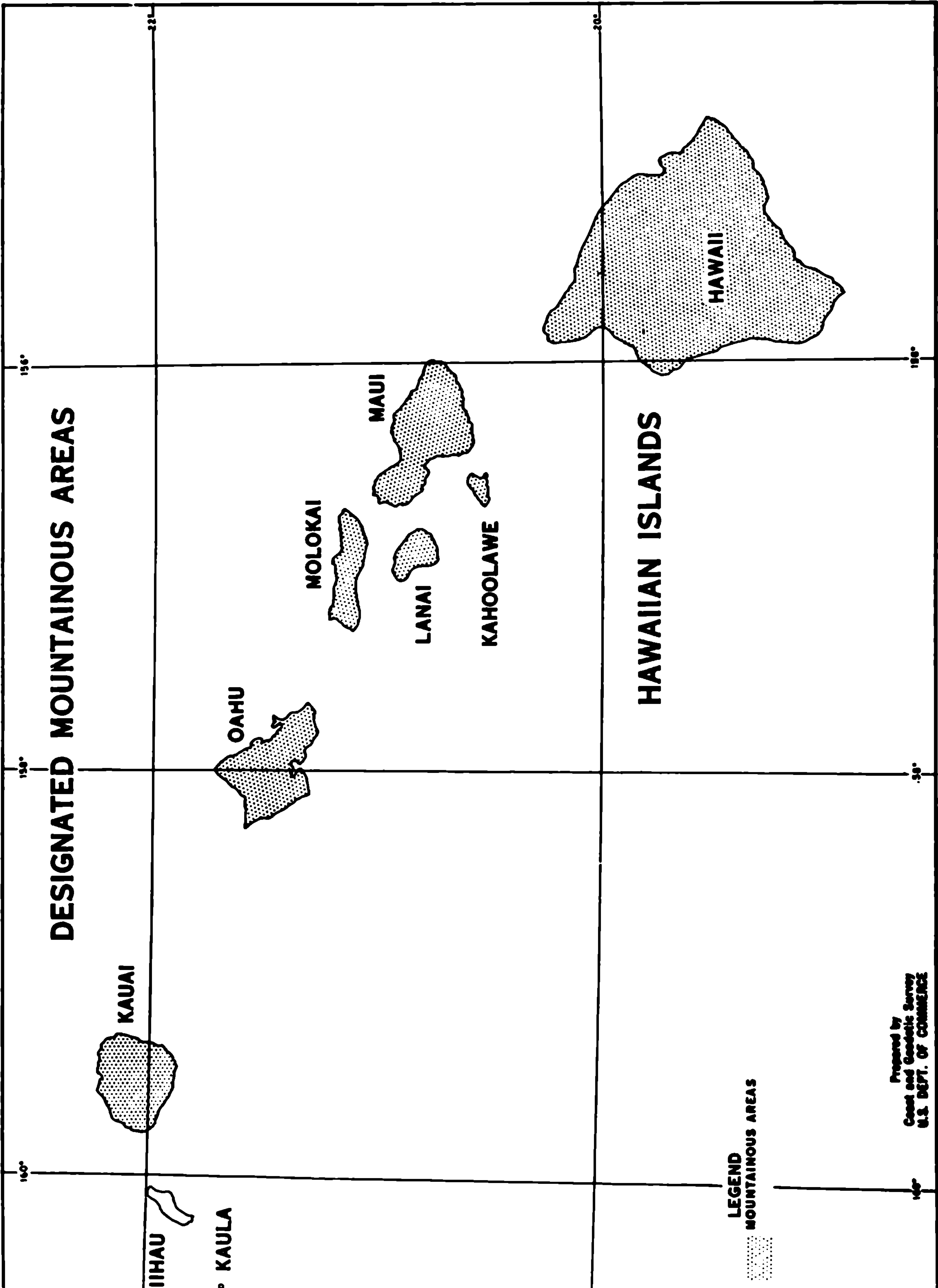
DESIGNATED MOUNTAINOUS AREAS

DESIGNATED MOUNTAINOUS AREAS



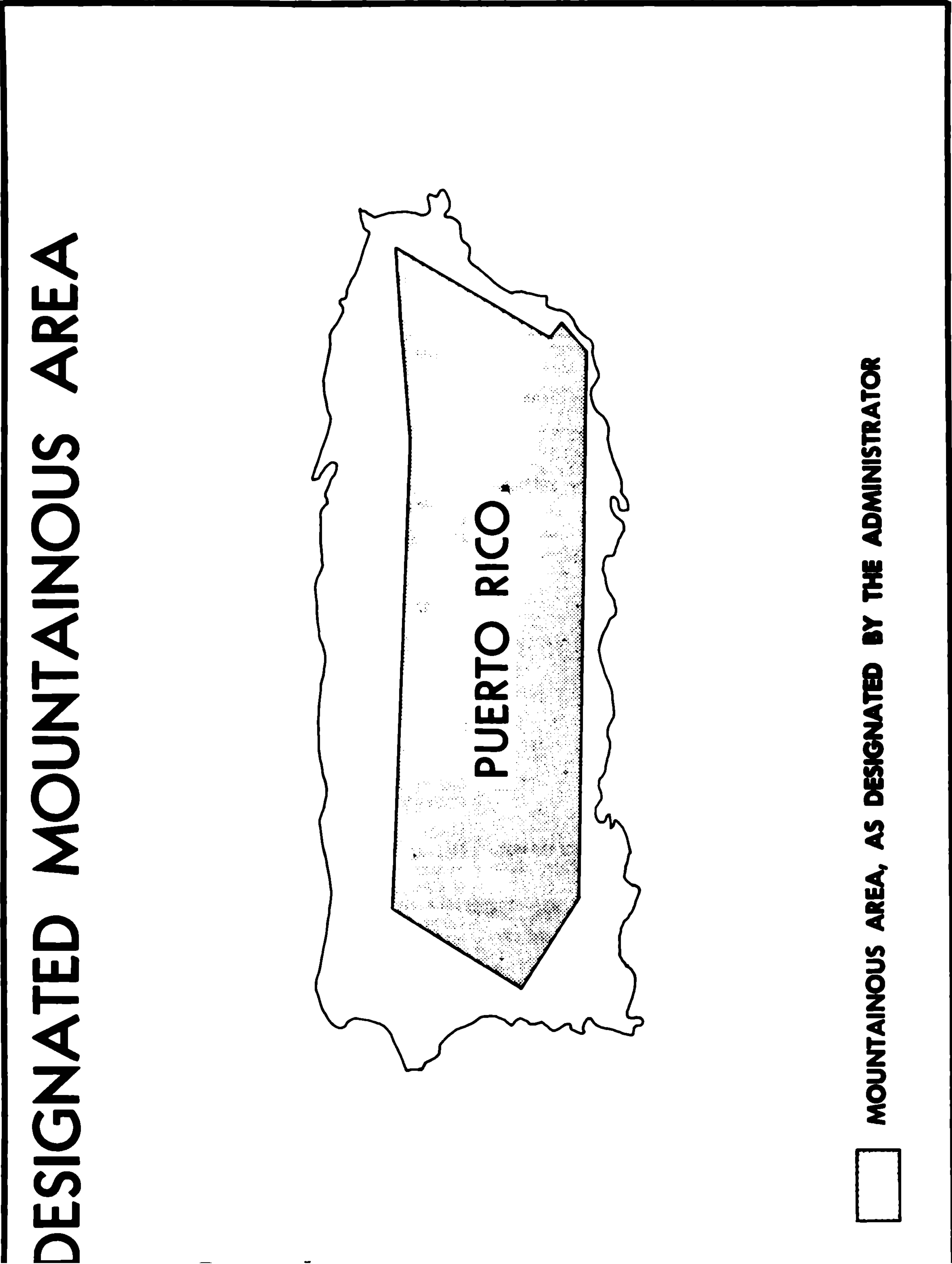


DESIGNATED MOUNTAINOUS AREAS





DESIGNATED MOUNTAINOUS AREAS





SCATER PROCEDURES

(Security Control of Air Traffic and  
Electromagnetic Radiations)

1. All pilots should guard an ATC or Flight Service Station frequency at all times. When necessary, SCATER directives will be broadcast over these frequencies. VFR flights may expect to be instructed to land at the nearest facility. IFR flights will proceed as directed by ATC.
2. When determined necessary in the interest of national security, rules for the Security Control of air traffic will become effective and will be consistent with those rules included in the published SCATER plan. Pilots should contact the nearest Air Traffic Control facility for further instructions, upon being advised that SCATER rules have been implemented.

INTERCEPTION SIGNALS

There are occasions when interceptor pilots are required to transmit instructions to pilots of intercepted aircraft. When radio communications are not available, the accompanying visual signals are used. These signals are applicable within the airspace over the United States including Alaska and Hawaii, and the territories and possessions of the United States, including the territorial waters thereof.

Interceptor pilots required to transmit instructions by visual means shall approach the aircraft to be intercepted from astern, employing the Interception Pattern for Identification of Transport Aircraft. A distance of at least 500 feet shall be maintained between aircraft exchanging signals. These signals have also been adopted by Canada and are applicable within the airspace over Canada.

FIRST SERIES

Signal by interceptor	Meaning	Response by intercepted Aircraft
Day Rocking wings from a position in front of intercepted aircraft and after acknowledgement a slow level turn on to the desired course. Night As day with the addition of a series of flashing lights at irregular intervals by any means available. Note:—If the interceptor intends only to lead intercepted aircraft away from an area it signals in front and to the left of the intercepted aircraft. If the interceptor intends to lead intercepted aircraft for a landing it signals in front and to the right of the intercepted aircraft. If the intercepted aircraft is unable to maintain sufficient speed to follow the interceptor: (1) The interceptor shall fly in the direction the intercepted aircraft should fly, circle to the left, and fly again in the proper direction. (2) When the area for descent is reached the interceptor shall circle to the right. The intercepted aircraft should then let down in the descending turn at the minimum rate of descent.	'Follow me'	Day or Night Rocking wings and following.
	'Fly in this direction'	Rocking wings and maintaining indicated direction.
	'Descend in this area'	Rocking wings and commencing descent.

SECOND SERIES

Signal by interceptor	Meaning	Response by intercepted aircraft
Day or Night An abrupt break away upward of 90 degrees or more.	'You may proceed'	Day or Night Rocking wings.

THIRD SERIES (To be used on arriving in vicinity of aerodrome).

Signal by interceptor	Meaning	Response by intercepted aircraft
Day Circling aerodrome and lowering landing gear. Night As day and showing steady lights if carried.	'Land at this aerodrome.'	Day or Night Same as interceptor, and proceed to land.

FOURTH SERIES (To be used if intercepted aircraft finds aerodrome inadequate.)

Signal by intercepted aircraft	Meaning	Response by interceptor
Day Rocking wings while passing over landing runway at a height exceeding 1,000 feet above the level of the aerodrome. Night Flashing landing lights while passing over the landing runway at a height not exceeding 1,000 feet above the level of the aerodrome. (If unable to flash landing lights, flash any lights available.)	'Aerodrome that you have designated is inadequate.'	Day or Night If it is desired that other aircraft follow him to an alternative aerodrome, the interceptor signals the FIRST series.  Should the interceptor decide to release intercepted aircraft he signals the SECOND series (meaning 'You may proceed')

DISTRESS SERIES

Signal by intercepted aircraft	Meaning	Response by interceptor
Day Porpoising.  Night Switching on landing lights and holding steady beam.	'In distress'.	Day or Night Use appropriate interception signal, as shown above.



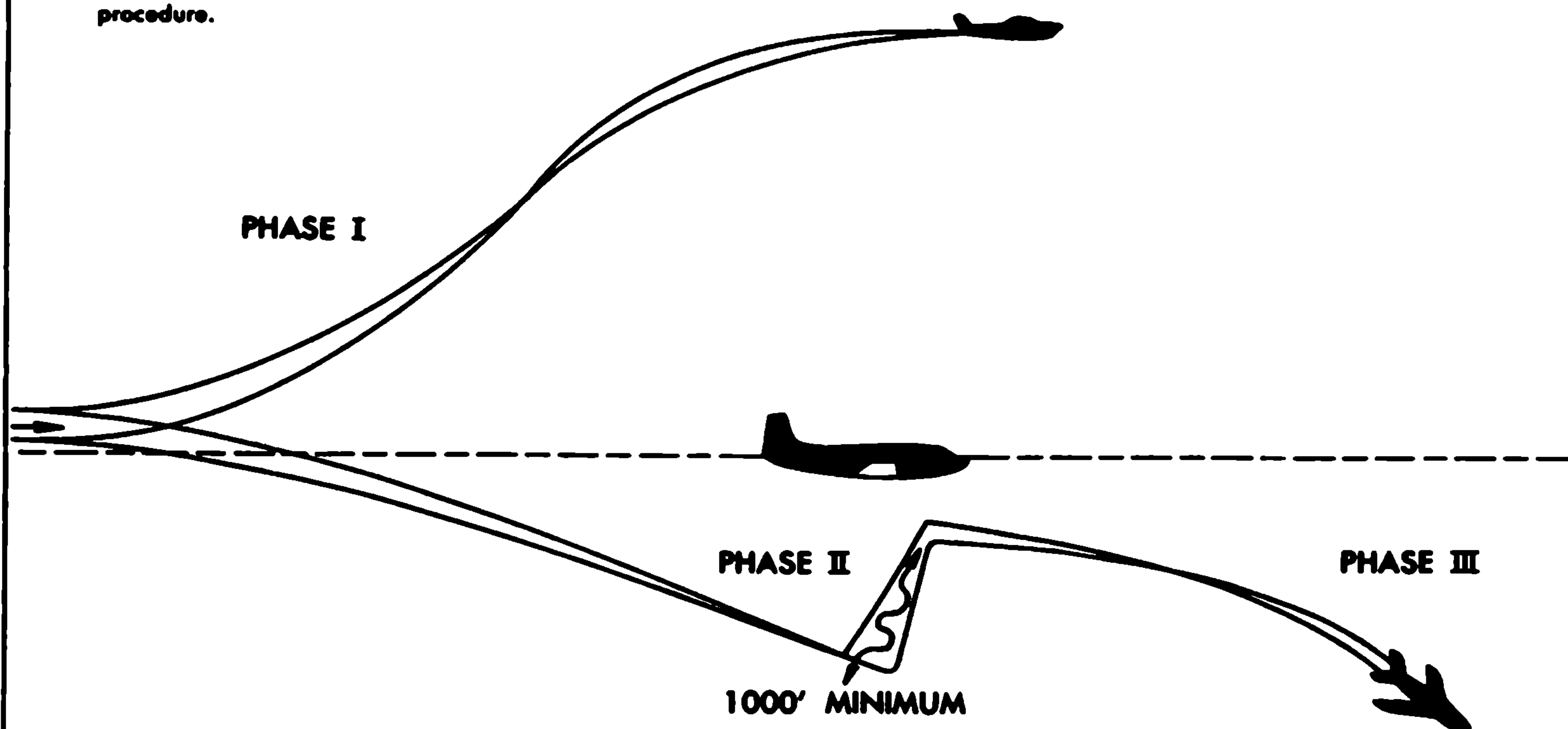
## INTERCEPTION PATTERN FOR IDENTIFICATION OF TRANSPORT AIRCRAFT

### PHASE I

Intercepting aircraft approach intercepted aircraft from astern. Element leader reduces throttle and extends dive brakes. Wingman continues to the opposite side of the intercepted aircraft from the leader and climbs to 4000 feet above target aircraft altitude for the purpose of maintaining surveillance, using economical power setting. Should weather ceiling not permit surveillance from this position, wingman will assume a position of either side of aircraft which will permit observation of both the aircraft and his element leader at a distance of 3000 feet from the intercepted aircraft, if visibility permits. During surveillance, wingman will maintain position by S-turns rather than reducing speed with dive brakes. The desired position of the element leader is 1000 feet abreast the aircraft at the aircraft's altitude. After speed and position are stabilized, element proceeds with Phase II of the procedure.

### PHASE II

Wingman continues surveillance. Element leader begins gentle closure of aircraft at same level until no closer than absolutely necessary to obtain information needed. As he gives identification information to director, wingman copies information for mission report. Element leader uses every precaution to avoid startling intercepted aircrew or passengers, keeping constantly in mind that maneuvers considered normal to a fighter aircraft may be considered hazardous to passengers and crews of nonfighter aircraft. Upon completion of identification, fighter-interceptors withdraw from aircraft's vicinity as outlined in Phase III.



INTERCEPTION PATTERN FOR  
DAY-VISUAL IDENTIFICATION  
OF AIRCRAFT

### PHASE III

Element leader breaks gently away from aircraft in shallow dive to pick up speed. Wingman stays well clear of intercepted aircraft and joins leader.



## EMERGENCY PROCEDURES

### GENERAL

1. A pilot in any emergency phase (uncertainty, alert, or distress) should do three things to obtain assistance:

a. *If equipped with IFF, switch to "Emergency" position.*

b. *Contact controlling agency and give nature of distress and pilot's intentions. If unable to contact controlling agencies, attempt to contact any agency on assigned frequency or any of the following frequencies (transmit and receive):*

Frequency	Emission	Effective Range in Nautical Miles	Guarded By
121.5 mc	Voice	Generally limited to radio line-of-sight	All military towers, most civil towers, VHF direction finding stns, radar facilities. Flight Service Stns. Ocean Station Vessels.
243.0 mc	Voice	Generally limited to radio line-of-sight	All military towers, most civil towers, VHF direction finding stns, radar facilities. Flight Service Stns. Ocean Station Vessels.
2182 kc	Voice	Generally less than 300 miles for average aircraft installations	Some ships and boats, Coast Guard stations, most commercial coast stations.
500 kc	CW	Generally less than 100 miles for average aircraft installations	Most large ships, most Coast Guard radio stations, most commercial coast stations.
8304 kc	CW	Up to several thousand miles, depending upon propagation conditions. Subject to "skip."	U.S.N. Direction Finding Stations, Ocean Station Vessels, most Coast Guard radio stations and some FAA International Flight Service Stations (IFSS).

Transmit as much of the following as possible:

(1) MAYDAY, MAYDAY, MAYDAY (if distress), or PAN, PAN, PAN (if uncertainty or alert). If CW transmission, use SOS (distress) or XXX (uncertainty or alert).

(2) Aircraft identification repeated three times.

(3) Type of aircraft.

(4) Position or estimated position (stating which).

(5) Heading (true or magnetic) (stating which).

(6) True airspeed or estimated true airspeed (stating which).

(7) Altitude.

(8) Fuel remaining in hours and minutes.

(9) Nature of distress.

(10) Pilot's intentions (bailout, ditch, crash landing, etc.).

(11) Assistance desired (fix, steer, bearing, escort, etc.).

(12) Two 10-second dashes with mike button (voice) or key (CW) followed by aircraft identification (once) and OVER (voice) or K (CW).

NOTE.—ARTCC emergency frequency capability normally does not extend to radar coverage limits. If the ARTCC does not respond to transmission on emergency frequency 121.5 mc or 243.0 mc, pilots should initiate a call to the nearest Flight Service Station or Airport Traffic Control Tower.

c. *Comply with instructions received. Accept the "communications control" offered to you by the ground radio station, silence interfering radio stations, and do not shift frequency or shift to another ground station unless absolutely necessary.*

2. Pilots of IFR flights experiencing two-way radio failure are expected to adhere to the procedures prescribed under "RADIO COMMUNICATIONS FAILURE" (F.A.R. PART 91.127). However, if a pilot should become lost, or if other factors prevent the pilot from being able to comply with prescribed procedures, such pilot, as well as pilot of VFR flights, may attempt to alert civil or military radar systems as follows:

a. *If receiver only is operating:* Fly triangular pattern to the RIGHT (see diagram). Hold each heading for two minutes (1 minute for jet use). Complete a minimum of two such patterns before resuming original course and then repeat pattern at 20-minute intervals. When flying triangular patterns to the right the emergency frequencies (121.5 or 243.0 mc) should be guarded. If pattern is observed by radar controllers, instructions will be given.

b. *If transmitter and receiver are both inoperative:* Fly a triangular pattern to the LEFT (see diagram), in the same manner as described above. If patterns are observed by radar controllers, an escort will be dispatched, if possible. If distressed aircraft is flying in IFR conditions or if at night, landing lights, navigational lights, etc., should be turned on to aid the interceptor. If intercepted, follow rescue aircraft.

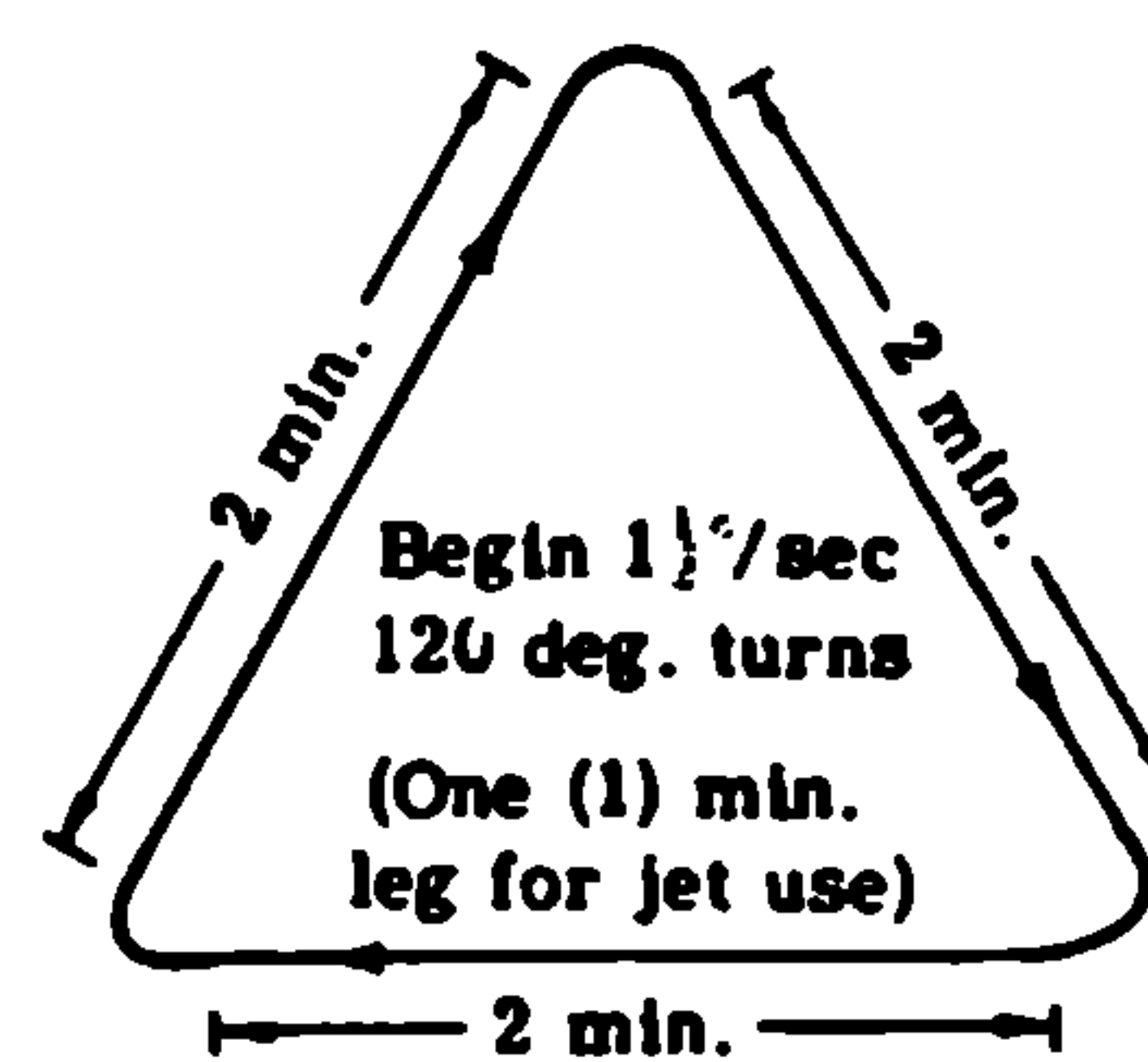


Figure 1 - With Receiver Operating Only

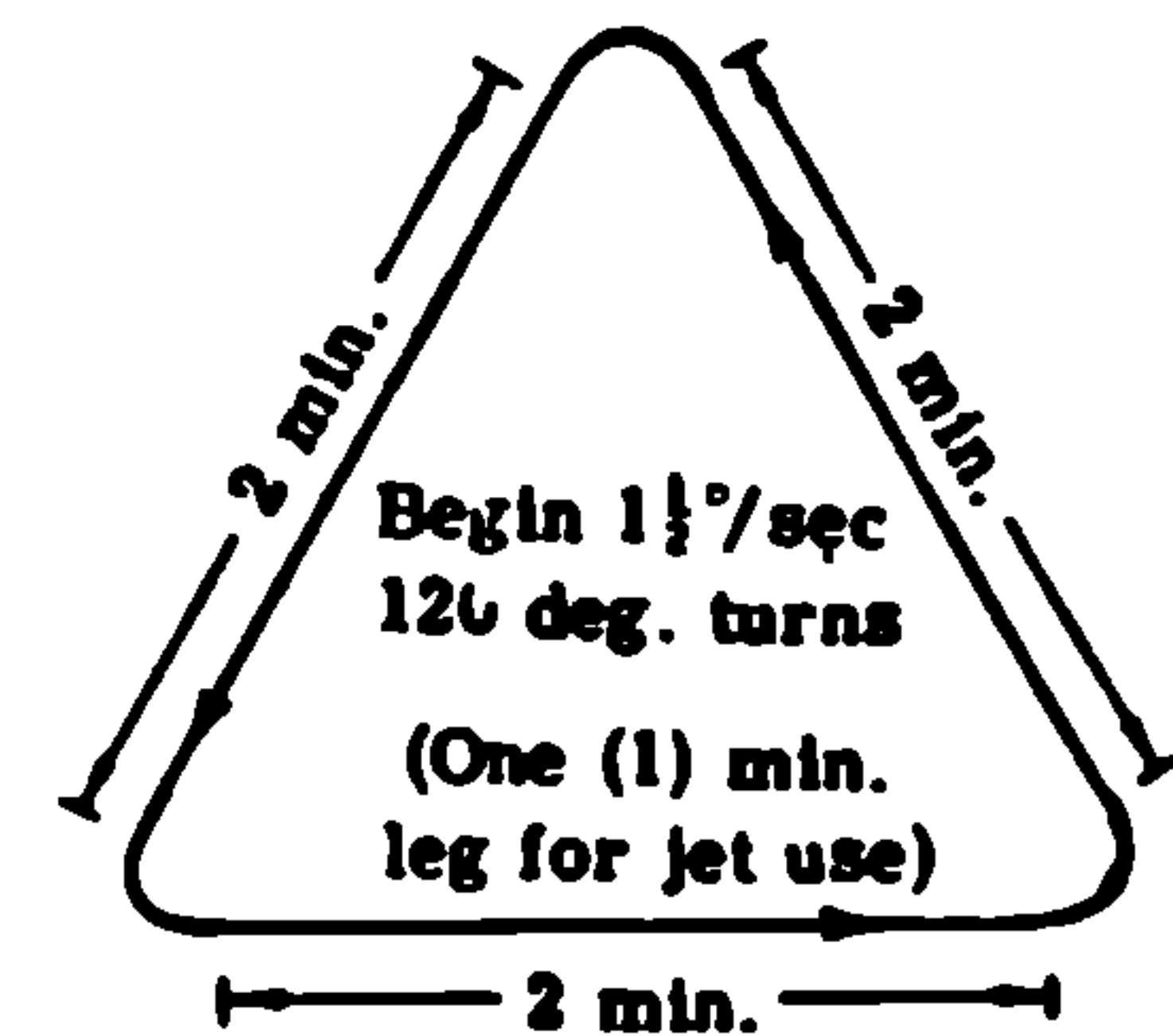


Figure 2 - With Transmitter and Receiver Inoperative



**GENERAL (Con't)**

c. The pilot should remember that he has *three* means of declaring an emergency:

- (1) Emergency IFF;
- (2) Sending emergency message; and
- (3) Flying triangular pattern.

d. Ground stations have *three* electronic means of assisting:

- (1) Receipt of emergency message;
- (2) Radar detection of IFF signal and triangular pattern; and
- (3) DF bearings.

e. Pilots should remember the **FOUR C's**

- (1) **Confess** your predicament to any ground radio station. Do not wait too long. Give SAR a chance!
- (2) **Communicate** with your ground link and pass as much of the distress message on first transmission as possible. We need information for best SAR action!
- (3) **Climb** if possible for better radar and DF detection. If flying at low altitude, the chance for establishing radio contact is improved by climbing, also chances of alerting radar systems are sometimes improved by climbing or descending.

**NOTE.**—Climbing or descending under IFR conditions within controlled airspace is not permitted except in *emergency*. Any variation in altitude, track, etc., in connection with flying radar patterns will be unknown to Air Traffic Control. Air Traffic Control will operate on the assumption that the provision of FAR, Part 91.127 are being followed by the pilot.

(4) **Comply**—especially *Comply*—with advice and instructions received, if you really want help. Assist the ground "communications control" station to control communications on the distress frequency on which you are working (as that is the distress frequency for your case). Tell interfering stations to maintain silence until you call. Cooperate!

3. For bailout, set radio for continuous emission. For ditching or crash landing, radio should, if it is considered that there is no additional risk of fire and if circumstances permit, be set for continuous transmission.

4. When a pilot is in doubt of his position, or feels apprehensive for his safety, he should not hesitate to request assistance. Search and Rescue facilities, including Radar, Radio, and DF stations, are ready and willing to help. There is no penalty for using them. Delay has caused and cost lives. Take Action!

**SEARCH AND RESCUE****1. GENERAL**

a. Search and Rescue is a life-saving service provided through the combined efforts of the FAA, Air Force, Coast Guard, State Boards, Aeronautic Commissions or other similar state agencies who are assisted by other organizations such as the Civil Air Patrol, Sheriff's Air Patrol, State Police, etc. It provides search, survival aid, and rescue of personnel of missing or crashed aircraft.

b. Prior to departure on every flight, local or otherwise, someone at the departure point should be advised of your destination and the route of flight if other than direct. Search efforts are often wasted and rescue is often delayed because of pilots who thoughtlessly take off without telling anyone where they are going.

c. All you need to remember to obtain this valuable protection is:

- (1) File a Flight Plan with an FAA Flight Service Station in person or by telephone or radio.
- (2) Close your flight plan.
- (3) If you land at a location other than the intended destination, report the landing to the nearest FAA Flight Service Station.
- (4) If you land en route and are delayed more than 30 min. (15 min. for jets), report this information to the nearest FSS.

(5) Remember that if you fail to report within one-half hour after your ETA, a search will be started to locate you.

d. If a crashed aircraft is observed:

- (1) Determine if crash is marked with yellow cross: If so, crash has already been reported and identified.
- (2) Determine, if possible, type and number of aircraft and whether there is evidence of survivors.
- (3) Fix, as accurately as possible, exact location of crash.
- (4) Transmit information to nearest FAA or other appropriate radio facility.

(5) Immediately after landing, make a complete report to nearest FAA, Air Force, or Coast Guard installation. Report may be made by long distance collect telephone.

e. To assure survival and rescue in the event of a crash landing the following advice is given:

(1) For flight over uninhabited land areas, it is wise to take suitable survival equipment depending on type of climate and terrain.

(2) If forced landing occurs at sea, chances for survival are governed by degree of crew proficiency in emergency procedures and by effectiveness of water survival equipment.

(3) If it becomes necessary to ditch, distressed aircraft should make every effort to ditch near a surface vessel. If time permits, the position of the nearest vessel can be obtained from a Coast Guard Rescue Coordination Center through the FAA facility.

(4) The rapidity of rescue on land or water will depend on how accurately your position may be determined. If flight plan has been followed and your position is on course, rescue should be prompt.

(5) Unless you have good reason to believe that you will not be located by search aircraft, it is better to remain near your aircraft and prepare means for signalling whenever aircraft approach your position.

f. Search and Rescue facilities include:

- (1) Rescue Coordination Centers;
- (2) Search and Rescue aircraft;
- (3) Rescue vessels;
- (4) Pararescue and ground rescue teams;
- (5) Emergency radio fixing.

**2. CLOSE YOUR FLIGHT PLAN**

a. The control tower does not automatically close flight plans since many of the landing aircraft are not operating on flight plans. It remains the responsibility of a pilot to close his own flight plan. This will prevent a needless search.

**3. NATIONAL SEARCH AND RESCUE PLAN**

a. Under the National Search and Rescue Plan, the U.S. Coast Guard is responsible for coordination of search and rescue for the Maritime Region, and the



**SEARCH AND RESCUE (Con't)**

U.S. Air Force is responsible for coordination of search and rescue for the Inland Region. In order to carry out this responsibility the Air Force and the Coast Guard have established Rescue Coordination Centers to direct search and rescue activities within their regions. This service is available to all persons and property in distress, both civilian and military. Normally, for aircraft incidents, information will be passed to the Rescue Coordination Centers through the appropriate Air Route Traffic Control Center.

**Coast Guard Rescue Coordination Centers**

Boston, Mass. 227-3710	San Francisco, Calif. YU 6-5500, YU 6-3873
New York, N.Y. HA 2-5700	Seattle, Wash. MA 4-2002
Portsmouth, Va. 393-6081	Juneau, Alaska 6-2680, 6-2681 (Night)
Miami, Fla. FR 9-1871	Honolulu, Hawaii 5 0211, 5-8831
New Orleans, La. 527-6225	Kodiak, Alaska Naval Station Kodiak 379, 758
Cleveland, Ohio 861-0400	San Juan, Puerto Rico 722-2174
St. Louis, Mo. MA 1-8145	Bermuda 1-2173
Long Beach, Calif. HE 7-2941, HE 6-6268	

Coast Guard Rescue Coordination Centers are served by major radio stations which guard 500 kc (CW) and 2182 kc (voice). In addition, San Francisco and Honolulu guard 8364 kc and 247 Coast Guard units along the sea coasts of the United States and shores of the Great Lakes guard 2182 kc (voice). All of these facilities are available for reporting distress or potential distress. THE CALL "NCU" (CW) or "COAST GUARD" (VOICE) ALERTS ALL COAST GUARD RADIO STATIONS WITHIN RANGE.

**Air Force Rescue Coordination Centers****Eastern Air Rescue Center**

Robins AFB, Ga. ----- 926-5755	Alabama, Connecticut, Delaware, District of Columbia, Florida, Georgia, Kentucky, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia.
Area dial code is 912	

**Central Air Rescue Center**

Richard-Gebaur AFB, Mo. DI 5-4400, ext. 7517, 7518 or 7519 ED 1-1200, Belton, Mo.	Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Wisconsin, Wyoming.
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**Western Air Rescue Center**

Hamilton AFB, Calif. --	Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, Washington, Elmendorf Air Force Base, Alaska.
TU 3-4112,	
TU 3-7711	
ext. 291570	
BR 5-0645, SK 2-0227	

**REPORTING AIRCRAFT ACCIDENTS, INFLIGHT HAZARDS AND OVERDUE AIRCRAFT**

(Civil Aeronautics Board, Safety Investigation Regulations, Part 320 (In part)).

**1. NOTIFICATION**

a. The operator of an aircraft shall immediately, and by the most expeditious means available, notify the Civil Aeronautics Board, Bureau of Safety Field Office nearest the accident or occurrence when:

(1) As a result of the operation of an aircraft, any person (occupant or nonoccupant) receives fatal or serious injury or any aircraft receives substantial damage;

(2) Aircraft collide in flight;

(3) The following inflight hazards are experienced:

(a) Fire;

(b) Rapid decompression requiring emergency action;

(c) Unwanted or asymmetrical thrust reversal;

(d) Flight control system malfunction or failure;

(e) Inability of any required flight crew member to perform his normal flight duties as a result of injury or illness.

(f) An aircraft is overdue and is believed to have been involved in an accident.

b. The following information is required if available:

(1) Location;

(2) Date;

(3) Time;

(4) Aircraft make, model, and registration number and nationality;

(5) Names of operator and crew;

(6) Number of persons involved;

(7) Injuries of each person;

(8) Weather conditions;

**2. MANNER OF NOTIFICATION**

The most expeditious method of notification to the Civil Aeronautics Board by the operator will be determined by the circumstances existing at that time. The Civil Aeronautics Board has advised that any of the following would be considered examples of the type of notification that would be acceptable:

(a) Direct telephone notification.

(b) Telegraphic notification.

(c) Notification to the Federal Aviation Agency who would in turn notify the CAB by direct communication; i.e., dispatch or telephone.

**3. REPORTS**

a. The operator shall file a report on CAB Form 453 or 454, available from the Civil Aeronautics Board Field Offices, the Civil Aeronautics Board, Washington, D.C., and the Federal Aviation Agency Flight Standards District Office:

(1) Within ten (10) days after an occurrence for which notification is required in 1 (a) and (c) above;

(2) When, after seven (7) days, an overdue aircraft is still missing;



**SEARCH AND RESCUE (Con't)**

(3) Upon request of an authorized representative of the Civil Aeronautics Board;

b. Each crew member, if physically able at the time the report is submitted, shall attach thereto a statement setting forth the facts, conditions and circumstances relating to the accident or occurrence as they appear to him to the best of his knowledge and belief. If the crew member is incapacitated, he shall submit the statement as soon as he is physically able.

**4. WHERE TO FILE REPORTS**

a. The operator of an aircraft shall file with the Field Office of the Civil Aeronautics Board nearest the accident or occurrence any report required by this section involving:

(1) Aircraft having a maximum take-off weight of more than 12,500 pounds or rotorcraft regardless of weight.

(2) Aircraft having a maximum take-off weight of 12,500 pounds or less operated by an air carrier certificated to engage in air transportation in the State of Alaska; and

(3) Aircraft, regardless of maximum take-off weight, where fatal injuries have occurred to any occupant of such aircraft.

b. The operator of an aircraft shall file with the FAA Flight Standards District Office nearest the accident or occurrence any report required by this section involving fixed-wing aircraft with a maximum take-off weight of 12,500 pounds or less except reports which are required to be filed with the Board pursuant to paragraph A above. FAA Flight Standards District Offices are listed on last page of Section II in Airman's Information Manual.

c. Civil Aeronautics Board field Safety Office addresses and telephone numbers are **Anchorage:** P.O. Box 2219, Anchorage, Alaska; BRoadway 2-7001. **Chicago:** Suite 206, 6525 North Avenue, Oak Park, Ill.; Village 8-9565. **Denver:** 1549 Emporia Street, Aurora, Colo.; EMpire 6-8249. **Fort Worth:** 100 North University Drive, University Plaza Building, Fort Worth 7, Tex.; EDison 6-2463. **Kansas City:** 912 East 63d Street, Kansas City, Mo. 64110; EMerson 3-2220 and 3-2221. **Los Angeles:** Los Angeles International Airport, 5820 Avion Drive, Room 228, Los Angeles 45, Calif.; SPring 6-0117. **Miami:** P.O. Box 48-0031, Miami International Airport, Miami 48, Fla.; TUXedo 5-2445. **New York:** Federal Building, Room 101, New York International Airport, Jamaica, Long Island, New York; 995-3333. **Oakland:** P.O. Box 2386, Oakland Airport Station, Oakland 14, Calif.; LOKkhaven 8-1290. **Seattle:** Room 202, Administration Building, King County Airport, Seattle 8, Wash.; PARKway 3-0474.

## **TWO-WAY RADIO COMMUNICATIONS FAILURE**

### **(F.A.R. PART 91.127)**

1. Effective May 27, 1965, paragraph (c) of FAR 91.127 was amended to prescribe procedures to be followed in the event of two-way radio communications failure.

For information § 91.127, IFR Operations: Two-way radio communications failure, is quoted:

a. **General.** Unless otherwise authorized by ATC, each pilot who has two-way radio communications failure

when operating under IFR shall comply with the rules of this section.

b. **VFR conditions.** If the failure occurs in VFR conditions, or if VFR conditions are encountered after the failure, each pilot shall continue the flight under VFR and land as soon as practicable.

c. **IFR conditions.** If the failure occurs in IFR conditions, or if paragraph (b) of this section cannot be complied with, each pilot shall continue the flight according to the following:

**(1) Route.**

(i) By the route assigned in the last ATC clearance received;

(ii) If being radar vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;

(iii) In the absence of an assigned route, by the route that ATC has advised may be expected in a further clearance; or

(iv) In the absence of an assigned route or a route that ATC has advised may be expected in a further clearance, by the route filed in the flight plan.

(2) **Altitude.** At the highest of the following altitudes or flight levels:

(i) The altitude or flight level assigned in the last ATC clearance received;

(ii) The minimum altitude (converted, if appropriate, to minimum flight level as prescribed in § 91.81 (c)) for IFR operations; or

(iii) The altitude or flight level ATC has advised may be expected in a further clearance.

(3) **Climb.** When it is necessary to climb in order to comply with subparagraph (2) of this paragraph, the following applies:

(i) Climb to the assigned altitude or flight level in accordance with the last ATC clearance received;

(ii) Climb to the minimum altitude for IFR operation at the time or place necessary to comply with that minimum; or

(iii) Climb to the altitude or flight level ATC has advised may be expected in a further clearance at the time or place included in the expect-further-clearance.

(4) **Leave holding fix.** If holding instructions have been received, leave the holding fix at the expect-further-clearance time received, or, if an expected approach clearance time has been received, leave the holding fix in order to arrive over the fix from which the approach begins as close as possible to the expected approach clearance time.

(5) **Descent.** Begin descent from the en route altitude or flight level upon reaching the fix from which the approach begins, but not before—

(i) The expect-approach-clearance time (if received); or

(ii) If no expect-approach-clearance time has been received, at the estimated time of arrival, shown on the flight plan, as amended with ATC.

2. In the event of two-way radio communications failure, ATC service will be provided on the basis that the pilot is operating in accordance with FAR 91.127.

3. Pilots who experience radio communications failure are urged to listen on any operational radio receiver for information broadcast by Air Traffic Control. Controllers have the capability of transmitting on most navigational facilities and do so when an aircraft communications failure is recognized.



**RADIO COMMUNICATION FAILURE (Con't)**

4. It is virtually impossible to provide regulations and procedures applicable to all possible situations associated with two-way radio communications failure. During two-way radio communications when confronted by a situation not covered in the regulation, pilots are expected to exercise good judgment in whatever action they elect to take. Should the situation so dictate, they should not be reluctant to use the emergency action contained in FAR 91.3(b).

5. **In VFR Conditions.** The primary objective of this provision in FAR 91.127 is to preclude extended IFR operations in the air traffic control system in VFR weather conditions. Pilots should recognize that operation under these conditions may unnecessarily as well as adversely affect other users of the airspace, since ATC may be required to reroute or delay other users in order to protect the failure aircraft. However, it is not intended that the requirement to "land as soon as practicable" be construed to mean "as soon as possible." The pilot retains his prerogative of exercising his best judgment and is not required to land at an unauthorized airport, at an airport unsuitable for the type of aircraft flown, or to land only minutes short of his destination.

6. **Holding.** If holding is necessary at the radio fix to be used for the approach, holding and descent to the initial altitude for the execution of the instrument approach should be accomplished in a holding pattern on the side of the final approach course on which the procedure turn is prescribed.

**7. Special Military Procedures.**

a. **Jet holding.** Where approved military jet penetration procedures have been published for the airport, holding and descent to initial penetration altitude/flight level should be accomplished in the holding pattern in accordance with the procedure depicted on the jet approach and landing chart for that airport.

b. **Aircraft Delayed En Route.** Aircraft, on a flight in which a delay en route is planned, shall commence descent at the destination, at the estimated time of arrival (ETA) derived from the estimated time en route (ETE) plus any delay for which an ATC clearance has been obtained.

**Example No. 1:**

Point-to-point flight plan from A to B to C to D (airport of destination). Estimated elapsed time en route specified in flight plan is three hours (A to D). Remarks indicate proposed two-hour local flight at B and one-hour local flight at C. On departure, flight is cleared to D (or a short range clearance limit). If radio communications failure is experienced prior to reaching B, flight should proceed to destination in accordance with established radio communications failure procedures. If the flight has obtained an amended clearance authorizing a two-hour delay at B and experiences radio communications failure prior to reaching B or after local flight is begun, local flight at B will be completed. Local flight at C will not be executed.

**Example No. 2:**

Round Robin flight plan from Point A to B to C and back to A. Estimated elapsed time en route specified in flight plan is three hours (A to A). Remarks indicate one-hour local flight at B and one-hour local flight at A prior to landing. Action governing delay at B would be indicated in example

No. 1. If the flight is cleared for local flight at A and subsequently experiences radio communications failure, local flight will be completed before beginning letdown.

c. **Aerial Refueling**—Aircraft which have received authorization from ATC to conduct refueling operations involving more than one altitude/flight level and have not received clearance beyond the refueling track should exit the track at the lowest altitude/flight level specified in the clearance for the refueling portion of the flight and proceed in accordance with radio communications failure procedures.

d. **Oil Burner**—Aircraft which have been cleared for descent to the low altitude(s) of the route shall maintain the altitude(s) specified for the route. Aircraft which have not been cleared to descend to the Oil Burner route low altitude(s) shall maintain the last assigned altitude/flight level and proceed in accordance with radio communications failure procedures.

e. **Turbojet En Route Penetration**—Aircraft which have been cleared for an en route penetration will proceed to the radio facility to be used for the approach at the destination airport at the last assigned altitude or the Minimum Safe Altitude whichever is higher and from that altitude execute the published penetration in lieu of climbing to the initial penetration altitude.

**FUEL JETTISONING**

1. Should it become necessary to jettison fuel, the pilot should immediately advise Air Traffic Control. Upon receipt of advice that an aircraft will jettison fuel, Air Traffic Control will broadcast or cause to be broadcast immediately and every 3 minutes thereafter on appropriate Air Traffic Control, Flight Service Station and airline company radio frequencies the following:

**ADVISORY TO AIRCRAFT NOT ON ATC CLEARANCE—FUEL DUMPING IN PROGRESS**—(aircraft type) (present position) course(s) (altitude)—**AVOID FLIGHT WITHIN 5 NAUTICAL MILES OF FUEL DUMP AIRCRAFT.**

2. Upon receipt of such a broadcast, pilots of aircraft affected, which are not on IFR flight plans or special VFR clearances, should clear the area specified in the advisory. Aircraft on IFR flight plans or special VFR clearances will be provided specific separation by Air Traffic Control. At the termination of the fuel jettisoning operation, pilots should advise Air Traffic Control. Upon receipt of such information, Air Traffic Control will issue, on appropriate frequencies, the following:

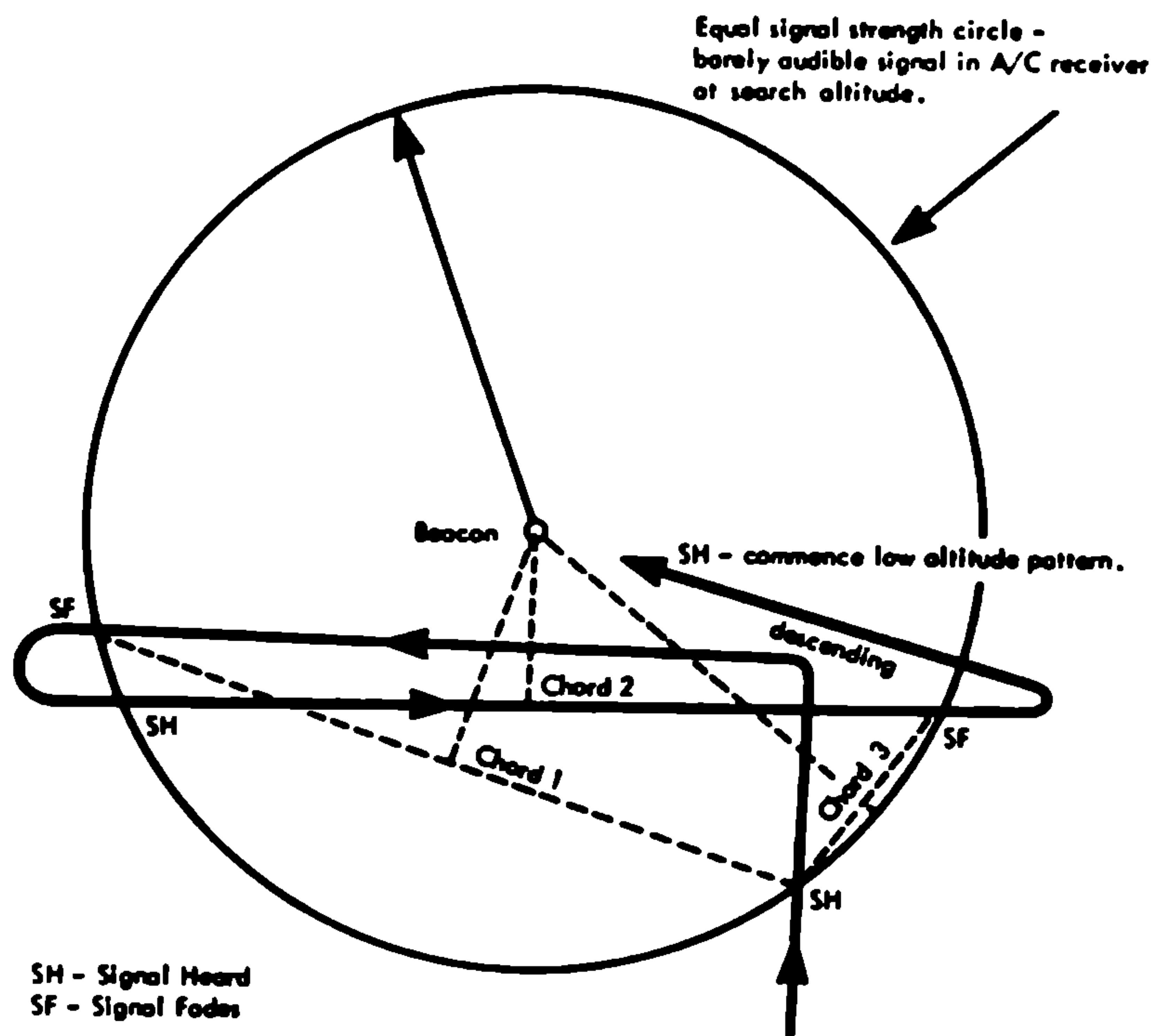
**ADVISORY TO ALL CONCERNED**—(aircraft type) **FUEL DUMP TERMINATED.**

**LOCATING RESCUE BEACON**

The initial search for survivors equipped with a VHF or UHF beacon will be at high altitude to take advantage of the increased range afforded by altitude. The receiver should be tuned to the frequency of the beacon with squelch off. The frequency should be guarded aurally, and visually if the search aircraft has suitable homing equipment. While some progress is being made toward standardization on the type of signal emitted by these survival beacons, search and rescue personnel should



LOCATING RESCUE BEACON (Con't)



realize that complete standardization may not be achieved in the near future. If the type of signal emitted by the particular beacon is not known, searchers should be alert

for any signal on the frequency, including a steady tone. Types of signals used by these beacons are: steady tone (this may become a warbling tone if the beacon is floating in the ocean); a definite warbling tone built into the beacon; an interrupted tone (a peculiar "beep-beep-beep") built into the beacon.

Once the beacon signal is detected, it will be a simple matter for the search aircraft with homing equipment. However, if the search aircraft has only receiver capability, it can still locate the survivors by flying a boxing-in pattern. Figure illustrates one such pattern. Boxing-in patterns assume that the lines of equal signal strength will be circular, as shown in figure. Thus, an aircraft flying at constant altitude can determine the limits of successive chords to the equal signal strength circle corresponding to a barely audible signal on its own receiver by plotting its position as the signal appears and again when it fades. The perpendicular bisector of each chord is an approximate line of position containing the beacon. The intersection of any 2 lines of position will indicate the approximate location of the beacon and the aircraft will be able to proceed to the approximate position and descending to appropriate altitude, the aircraft can then make another low-level boxing-in pattern and/or carry out a close visual search for the survivors by any convenient high probability visual search pattern.



GROUND-AIR VISUAL CODE

REQUIRE DOCTOR. SERIOUS INJURIES	I	REQUIRE SIGNAL LAMP WITH BATTERY, AND RADIO		REQUIRE FUEL AND OIL	L
REQUIRE MEDICAL SUPPLIES	II	INDICATE DIRECTION TO PROCEED	K	ALL WELL	LL
UNABLE TO PROCEED	X	AM PROCEEDING IN THIS DIRECTION	↑	NO	N
REQUIRE FOOD AND WATER	F	WILL ATTEMPT TAKE-OFF	└>	YES	Y
REQUIRE FIREARMS AND AMMUNITION	V	AIRCRAFT SERIOUSLY DAMAGED	L┐	NOT UNDERSTOOD	JL
REQUIRE MAP AND COMPASS	□	PROBABLY SAFE TO LAND HERE	△	REQUIRE MECHANIC	W

IF IN DOUBT, USE INTERNATIONAL SYMBOL



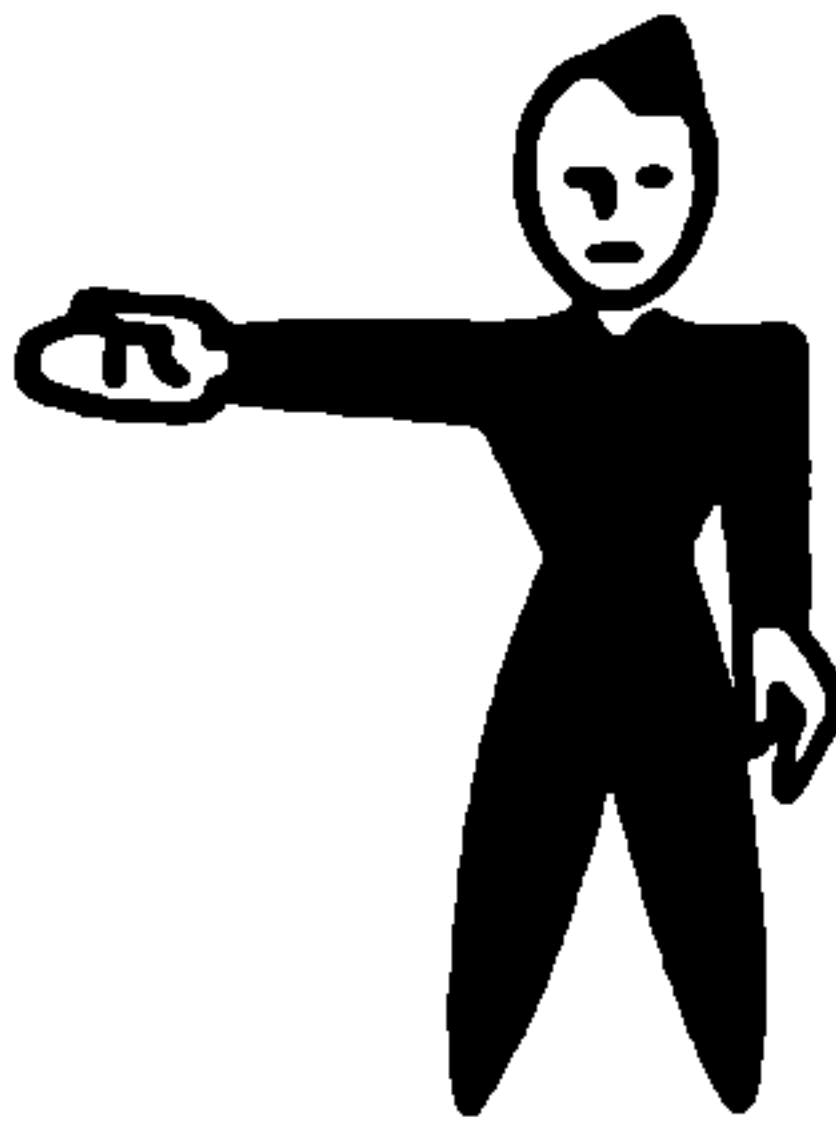
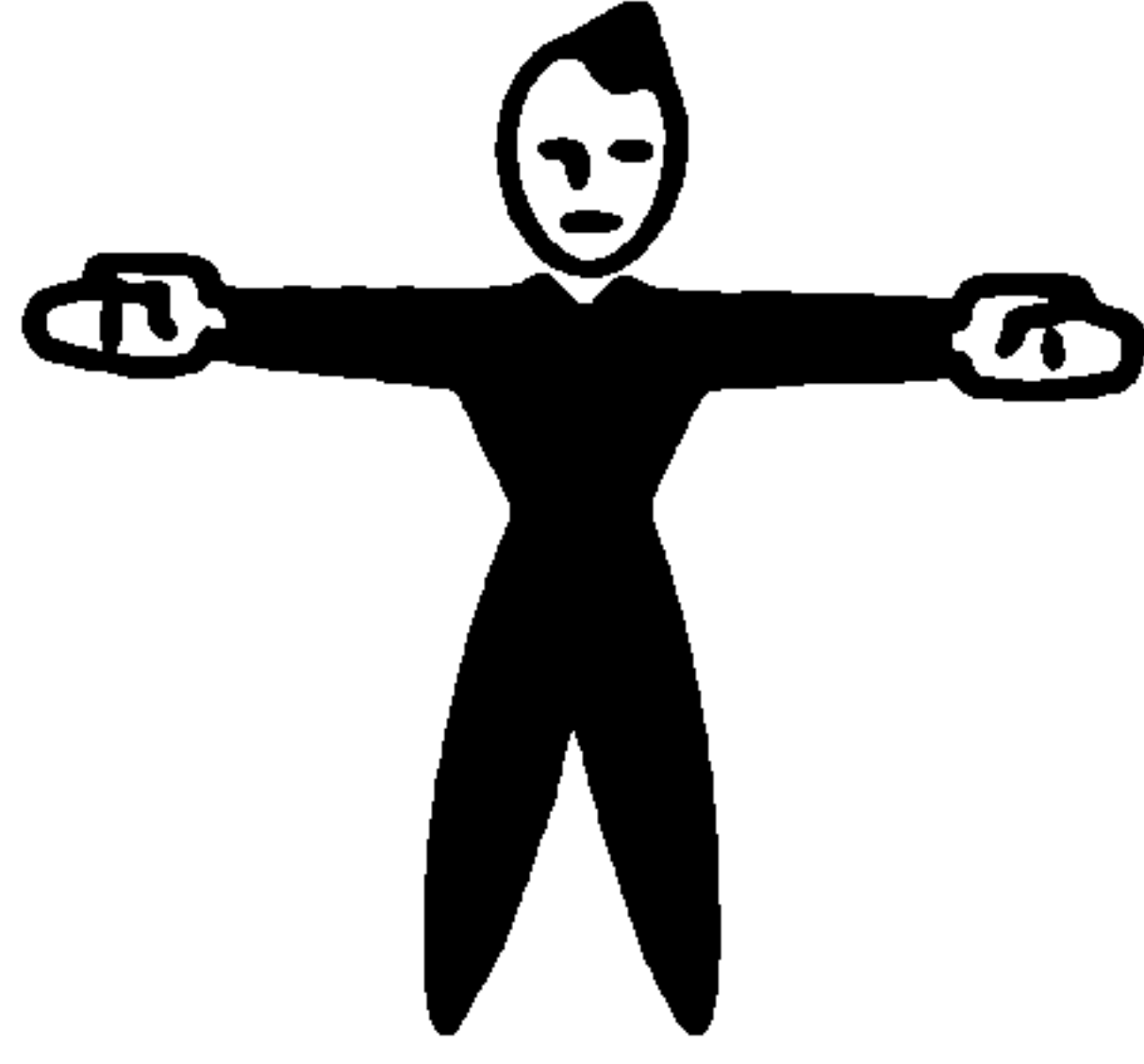
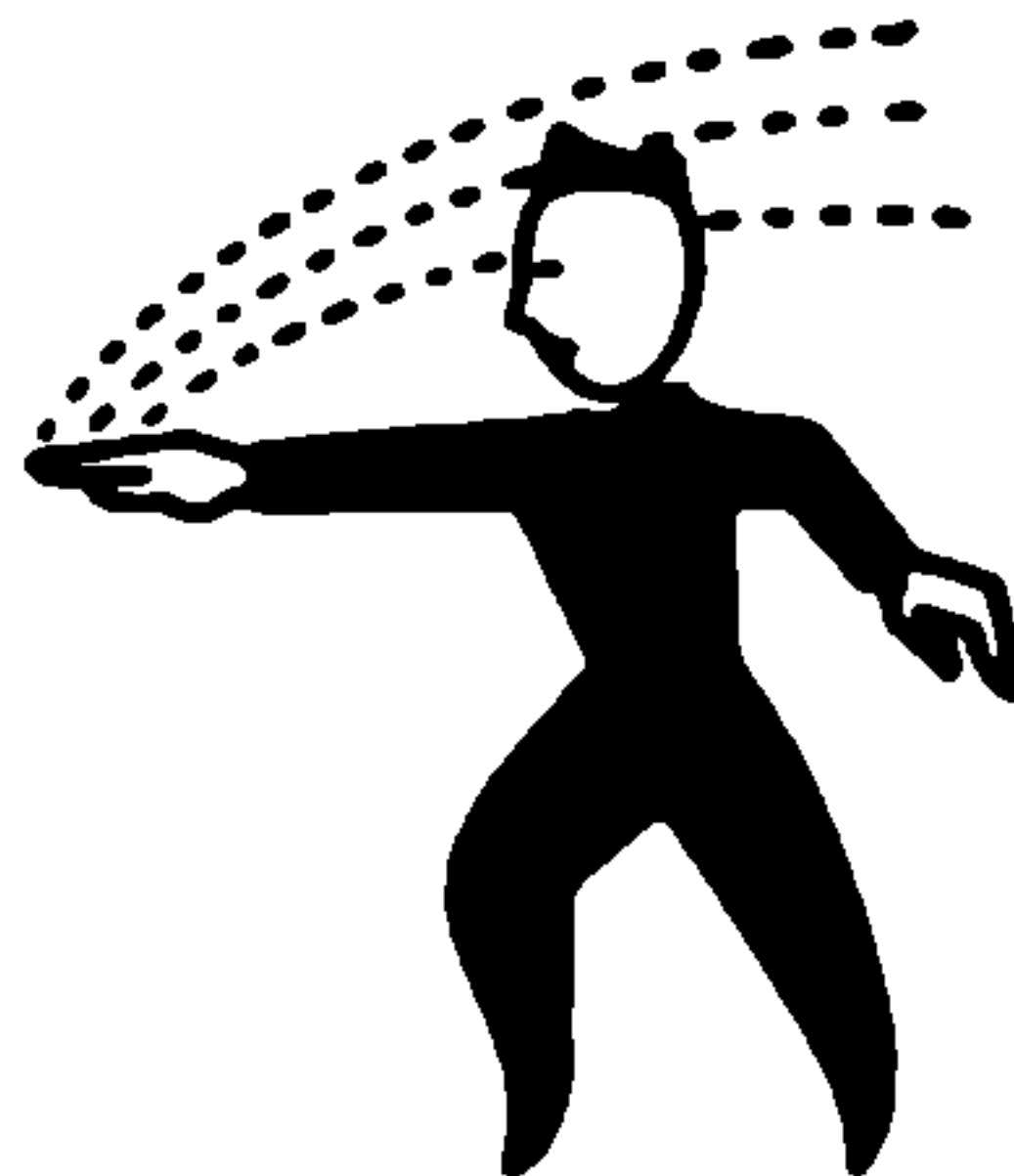

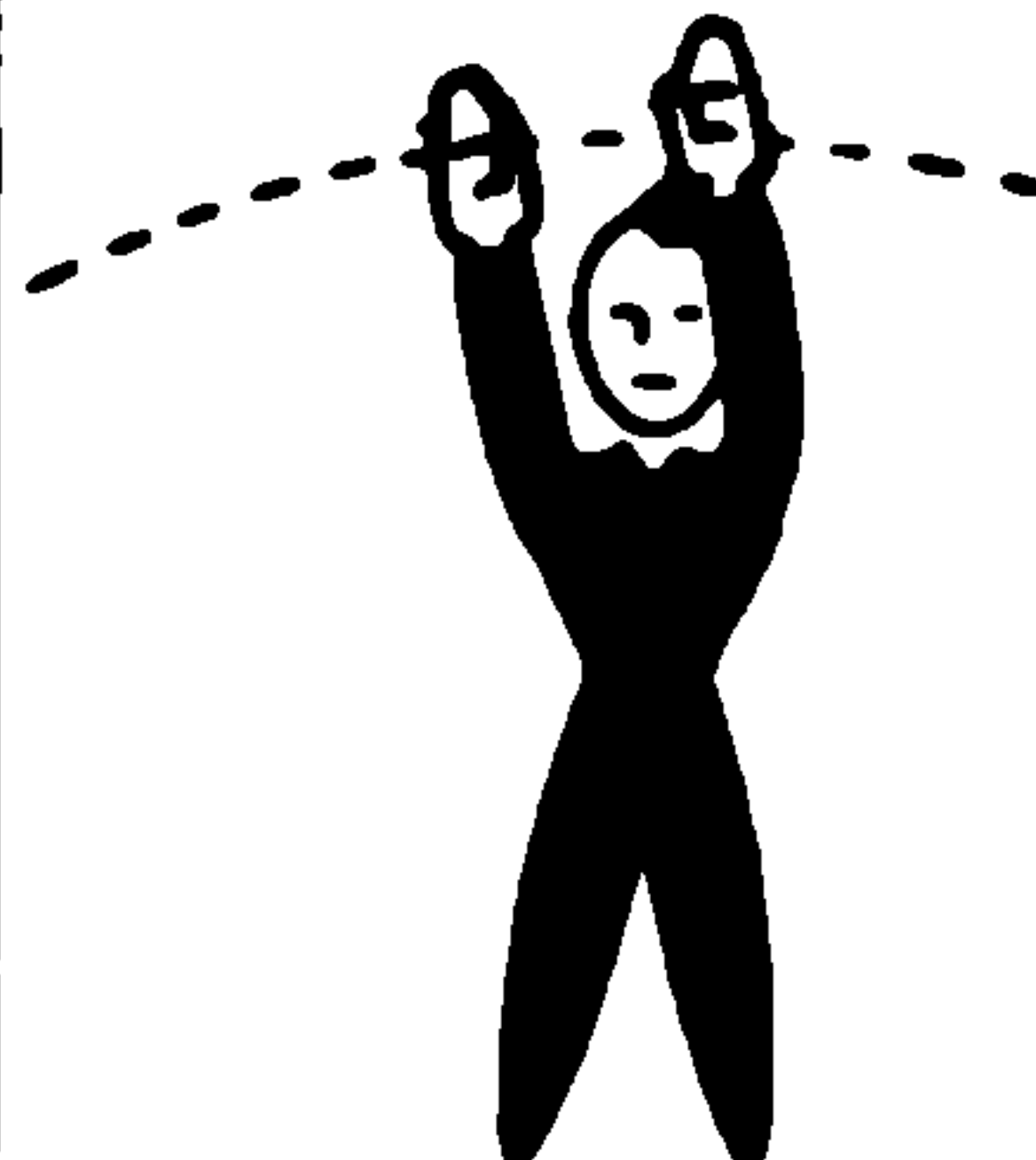

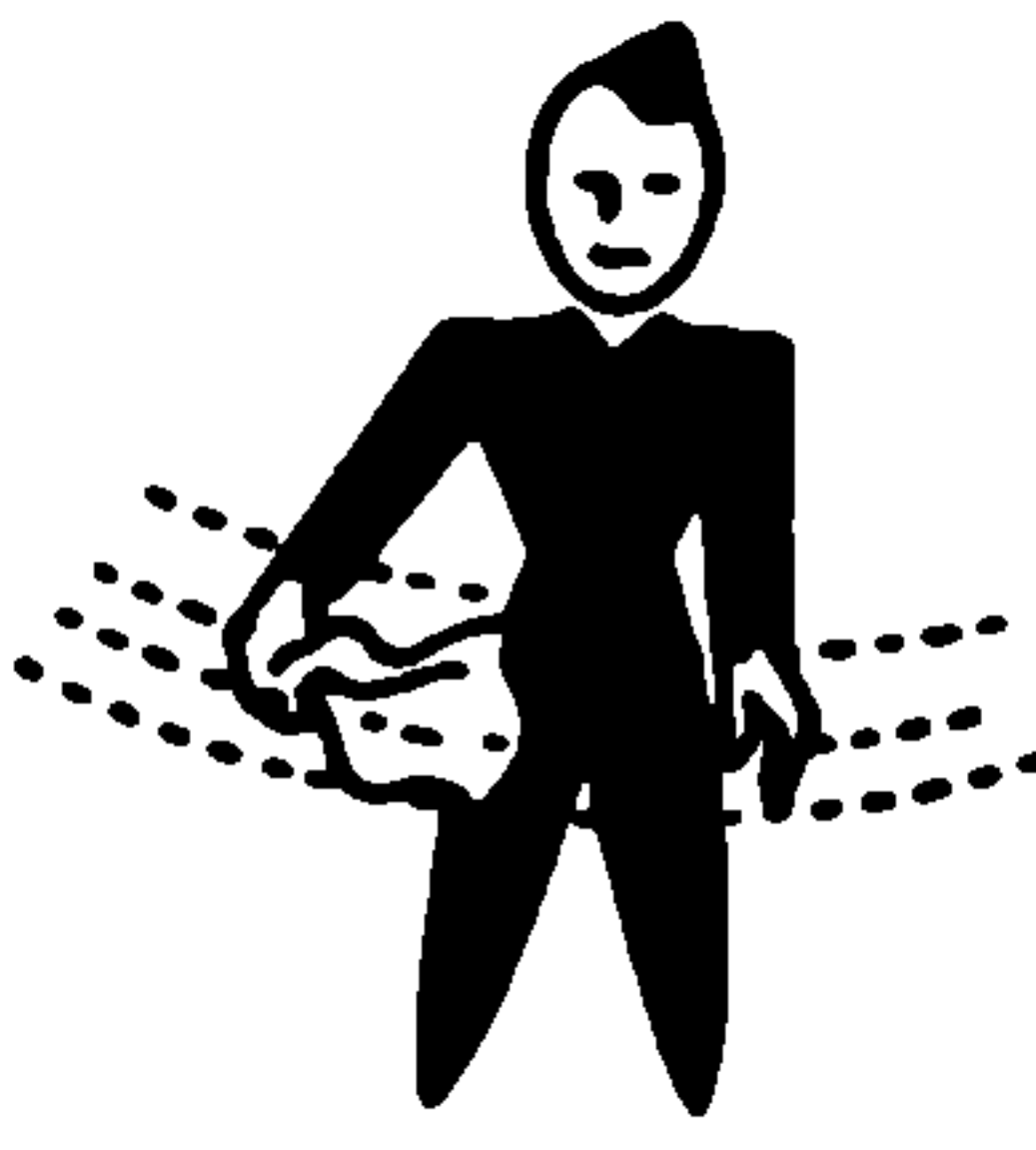


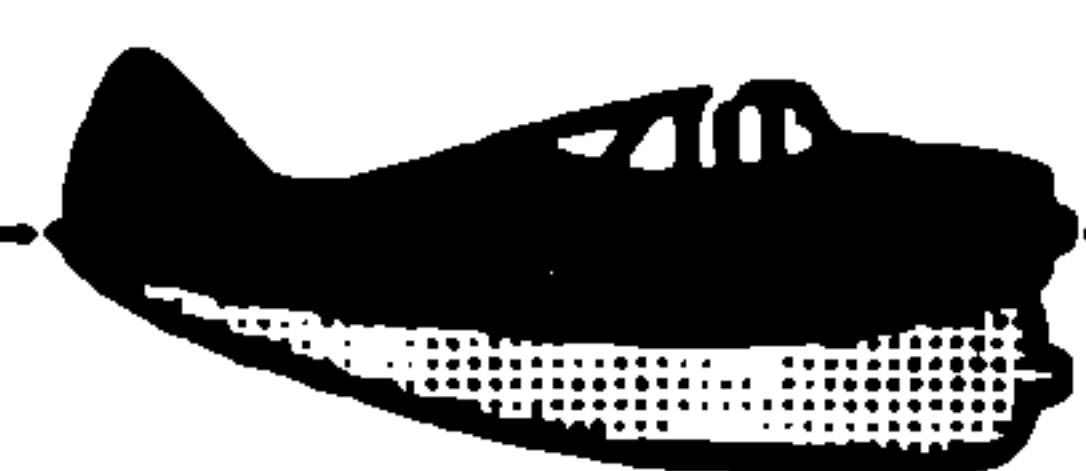

S O S

INSTRUCTIONS

1. Lay out symbols by using strips of fabric or parachutes, pieces of wood, stones, or any available material.
2. Provide as much color contrast as possible between material used for symbols and background against which symbols are exposed.
3. Symbols should be at least 10 feet high or larger. Care should be taken to lay out symbols exactly as shown.
4. In addition to using symbols, every effort is to be made to attract attention by means of radio, flares, smoke, or other available means.
5. On snow covered ground, signals can be made by dragging, shoveling or tramping. Depressed areas forming symbols will appear black from the air.
6. Pilot should acknowledge message by rocking wings from side to side.

GROUND-AIR VISUAL CODE FOR USE BY GROUND SEARCH PARTIES		
NO.	MESSAGE	CODE SYMBOL
1	Operation completed.	LLL
2	We have found all personnel.	<u>LL</u>
3	We have found only some personnel.	++
4	We are not able to continue. Returning to base.	XX
5	Have divided into two groups. Each proceeding in direction indicated.	↗↘
6	Information received that aircraft is in this direction.	→



VISUAL EMERGENCY SIGNALS			
			
<b>NEED MEDICAL ASSISTANCE-URGENT</b> Used only when life is at stake	<b>ALL OK-DO NOT WAIT</b> Wave one arm overhead	<b>CAN PROCEED SHORTLY-WAIT IF PRACTICABLE</b> One arm horizontal	<b>NEED MECHANICAL HELP OR PARTS-LONG DELAY</b> Both arms horizontal
			
<b>USE DROP MESSAGE</b> Make throwing motion	<b>OUR RECEIVER IS OPERATING</b> Cup hands over ears	<b>DO NOT ATTEMPT TO LAND HERE</b> Both arms waved across face	<b>LAND HERE</b> Both arms forward horizontally, squatting and pointing in direction of landing—Repeat
			
<b>NEGATIVE (NO)</b> White cloth waved horizontally	<b>AFFIRMATIVE (YES)</b> White cloth waved vertically	<b>PICK US UP-PLANE ABANDONED</b> Both arms vertical	<b>AFFIRMATIVE (YES)</b> Dip nose of plane several times
	<b>HOW TO USE THEM</b>  If you are forced down and are able to attract the attention of the pilot of a rescue airplane, the body signals illustrated on this page can be used to transmit messages to him as he circles over your location. Stand in the open when you make the signals. Be sure that the background, as seen from the air, is not confusing. Go through the motions slowly and repeat each signal until you are positive that the pilot understands you.		
<b>NEGATIVE (NO)</b>			



## GENERAL

## FLIGHT STANDARDS SERVICE DISTRICT OFFICES

Office	Phone No.	Office	Phone No.	Office	Phone No.
<b>EASTERN REGION</b>		<b>SOUTHERN REGION—Con't.</b>		<b>CENTRAL REGION—Con't.</b>	
<b>General Aviation</b>		<b>Air Carrier</b>		<b>Air Carrier</b>	
Albany, N.Y.	UN 9-7411	Atlanta, Ga.	526-7265	Chicago, Ill.	827-6623
Allentown, Pa.	CO 4-2431	Miami, Fla.	888 8474	Des Plains, Ill.	827-6623
Allentown, Pa.	CO 4-2888	Nashville, Tenn.	244-2254	Indianapolis, Ind.	CH 1-9296
Baltimore, Md.	SO 1-2610	Winston-Salem, N.C.	PA 5-0601	Kansas City, Kans.	HA 1-0135
Cincinnati, Ohio.	EA 1-7171	San Juan, P.R.	791-0374	St. Paul, Minn.	PA 1-1653
Cleveland, Ohio.	WI 1-3030			St. Louis, Mo.	PE 1-6800
•Columbus, Ohio.	469-7476	<b>SOUTHWEST REGION</b>		Ypsilanti, Mich.	482-7724
Harrisburg, Pa.	CE 4-0193	<b>General Aviation</b>		<b>WESTERN REGION</b>	
Lindenhurst, N.Y.	TU 8-1440	<b>General Aviation</b>		<b>General Aviation</b>	
Louisville, Ky.	GL 1-2930	Albuquerque, N. Mex.	247-0156	Boise, Idaho.	342-2861
Norwood, Mass.	762-2436	Amarillo, Tex.	DR 6-9481	Cheyenne, Wyo.	634-2652
Philadelphia, Pa.	OR 3-0250	Dallas, Tex.	FL 2-8453	Denver, Colo.	GE 3-7104
Pittsburgh, Pa.	HO 1-2726	El Paso.	778-6389	•Fresno, Calif.	251-6056
Pittsburgh, Pa.	HO 1-7800	Ft. Worth, Tex.	MA 4-1184	Long Beach, Calif.	HA 1-8287
Portland, Maine.	SP 4-1452	Houston, Tex.	OL 4-6557	Oakland, Calif.	NE 8-5711
Richmond, Va.	RE 7-8256	Little Rock, Ark.	FR 2-3437	Ontario, Calif.	YU 4-2411
Rochester, N.Y.	BE 5-3438	Lubbock, Tex.	PO 2-0335	Phoenix, Ariz.	261-4238
Teterboro, N.J.	AT 8-1745	New Orleans, La.	WH 4-6706	Portland, Oreg.	AT 8-5846
Washington, D.C.	NA 8-1555	Oklahoma City, Okla.	SU 9-5220	Reno, Nev.	FA 2-3790
Westfield, Mass.	LO 8 8691	San Antonio, Tex.	TA 6-2355	Sacramento, Calif.	GA 8-9614
<b>Air Carrier</b>		Shreveport, La.	422-8379	Salt Lake City, Utah.	524-5194
Boston, Mass.	LO 7-1224	<b>Air Carrier</b>		•San Diego, Calif.	293-5280
Idlewild, L.I., N.Y.	995-3709	Dallas, Tex.	FL 7-8297	Santa Monica, Calif.	EX 1-6701
LaGuardia, L.I., N.Y.	HA 6-9729	Ft. Worth, Tex.	BU 3-1556	Seattle, Wash.	PA 3-5600
LaGuardia, L.I., N.Y.	HA 6-9730	Houston, Tex.	MI 5-6628	Spokane, Wash.	KE 5-1601
Newark, N.J.	MA 4 2044	San Antonio, Tex.	TA 4-6373	Van Nuys, Calif.	ST 5-8624
Pittsburgh, Pa.	SP 1-2868	<b>CENTRAL REGION</b>		<b>Air Carrier</b>	
Utica, N.Y.	RE 6-6981	<b>General Aviation</b>		Burbank, Calif.	875-0410
Washington, D.C.	NA 8-1555	Billings, Mont.	245-7910	Denver, Colo.	DE 3-5475
<b>SOUTHERN REGION</b>		Des Moines, Iowa.	285-1541	Los Angeles, Calif.	OR 0-7722
<b>General Aviation</b>		Fargo, N.D.	232-8949	Los Angeles, Calif.	SP 6-0102
Atlanta, Ga.	DI 4-3033	Grand Rapids, Mich.	949-5370	San Francisco, Calif.	697-6900
Birmingham, Ala.	592-6371	Helena, Mont.	442-4230	Seattle, Wash.	PA 3-5604
Charlotte, N.C.	392-3214	Indianapolis, Ind.	CH 4-2473	<b>ALASKAN REGION</b>	
Columbia, S.C.	254-0391	Kansas City, Kans.	AT 1-3491	<b>General Aviation</b>	
Jackson, Miss.	366-0305	Lincoln, Nebr.	434-5949	Anchorage, Alaska.	BR 8-5401
Jacksonville, Fla.	EL 4-7111	Milwaukee, Wis.	SH 4-9202	Fairbanks, Alaska.	6-5122
Memphis, Tenn.	948-7701	Minneapolis, Minn.	PA 9-7301	Juneau, Alaska.	JU 6-3755
Miami, Fla.	888-8474	Rapid City, S.D.	FI 2-3738	<b>Air Carrier</b>	
Nashville, Tenn.	AL 5-7791	St. Louis, Mo.	PE 1-0930	Anchorage, Alaska.	BR 4-1965
Raleigh, N.C.	TE 2-6160	South Bend, Ind.	CE 2-5843	Fairbanks, Alaska.	GL 6-5122
St. Petersburg, Fla.	HE 6-9072	Springfield, Ill.	523-3657	Juneau, Alaska.	JU 6-3755
		West Chicago, Ill.	584-4490		
		Wichita, Kans.	WH 3-3244		
		Ypsilanti, Mich.	483-1226		



• BIRD HAZARDS

Migratory Patterns

The birds considered of greatest potential hazard to aircraft because of large size, abundance, or habit of flying in dense flocks are the whistling swans, Canada geese, snow geese, blue geese, white-fronted geese, mallards, pintails, gulls, vultures, starlings, and black-birds. Birds of these species are considered particularly hazardous during spring and fall migration and when they are concentrated in wintering areas. At some airports, large flocks of sandpipers, horned larks, tree swallows, longspurs, white pelicans, sandhill cranes, or other species could be a problem at certain seasons.

Unfortunately, we do not have complete data for the United States concerning the migration paths of all of these species, or the exact times of migration, or the altitudes at which these birds fly, or the effects of weather on migration patterns. However, available data are summarized below for birds of six of these species—whistling swans, Canada geese, snow geese, mallards, pintails, and double-crested cormorants.

Since migrating waterfowl tend to dive when closely approached by aircraft, pilots are warned not to fly directly under migrating flocks of swans, geese or ducks.

WHISTLING SWANS

Whistling swans are our largest common migratory waterfowl, and during the migration seasons concentrate in a narrow and fairly well-defined path passing close to the airports of Duluth, Milwaukee, Detroit, Toledo, Cleveland, Buffalo, Pittsburgh, Harrisburg, Baltimore, and Washington, D. C.

**Migration**—In the spring, swans migrate over Chesapeake Bay, the lower Susquehanna River, then overland to Lake Erie, through Michigan, Wisconsin, North Dakota, Manitoba, and Saskatchewan to the Canadian Arctic.

Some birds wintering on Great Salt Lake migrate northwest to the Pacific coast, then up the coast to Alaska; others migrate northeast through Montana, Alberta, and Saskatchewan to the breeding grounds.

Some Pacific coast swans migrate north along the coast, and others migrate through the interior, crossing over Washington, Alberta, and Saskatchewan to reach the breeding grounds. The fall flights are made over approximately the same routes.

Spring Migration Dates

ATLANTIC COAST		Peak
Chesapeake Bay to		
Lake Erie -----	Mar. 10-April 25	Mar. 20-Mar. 31
Michigan -----	Mar. 17-April 24	Mar. 18-April 11
Wisconsin -----	Mar. 24-April 15	Mar. 28-April 11
Minnesota -----	April 2-April 26	
North Dakota and northeastern South Dakota ----		April 10-April 20
WEST COAST		
Utah (Great Salt Lake) -	Leave in late March	
Oregon -----	Feb. 1-April 9	Mar. 18-Mar. 28
California (northern) -	Mar. 4-Mar. 25	
California (Sacramento Val.)	Jan. 24-Feb. 21	

Fall Migration Dates

ATLANTIC COAST		Peak
So. Saskatchewan ---	Sept. 9-Nov. 1	Oct. 15
So. Manitoba -----	Oct. 7-Nov. 16	
Minnesota, Wisconsin, and Michigan -----	Oct. 16-Nov. 23	
So. Ohio, Lake Erie, and Ontario -----	Oct. 18-Nov. 28	
Pennsylvania and Maryland -----	Oct. 20-Nov. 28	Oct. 25-Nov. 20
North Carolina -----	Oct. 21-	
WEST COAST		
Utah (Gr. Salt Lake)	Oct. 20-Nov. 15	(first arrivals)
Oregon -----	Oct. 1-Dec. 5	Oct. 15-Nov. 20
Nevada -----	Oct. 28-Nov. 20	
California (northern)	Nov. 8-Dec. 8	
California (Sacramento Val.)	Oct. 30-Nov. 26	

**Flight**—Swans are good fliers and make nonstop flights of several hundred miles (Chesapeake Bay to Lake Erie), sometimes at considerable altitude (up to approximately 6,000 feet).

CANADA GEESE

Geese are considered the greatest hazard to aircraft because of their abundance, large size, occurrence in large flocks, relatively slow flight and high altitude of flight. Of the 400,000 to 500,000 Canada geese that migrate between Hudson and James Bays and the Mississippi Valley, over 100,000 pass through Horicon Marsh in Wisconsin. In migrating between Horicon Marsh and southern Illinois, the bulk of these geese pass about 25 miles west of Milwaukee's Municipal Field and 50 miles west of O'Hare Field, Chicago. At times stray flocks pass over or very close to these airports. The thousands of Canada geese migrating to and from Jack Miner's sanctuary at Kingsville, Ontario, pass only 10 to 20 miles



CANADA GEESE—Continued

east of Detroit; and in the fall many of these birds pass close to the municipal airport at Toledo.

**Migration**—Canada geese migrate over several broad fronts. Atlantic coast birds breed mostly east of James and Hudson Bays; they migrate up Chesapeake Bay, cross to Lake Erie, and then fly north. Another flight goes up the Mississippi River and over the Great Lakes to the breeding ground west of Hudson Bay. Birds wintering on Great Salt Lake disperse to breed in the Northwestern States and the southern parts of the western Canadian Provinces. West coast geese migrate mostly north along the coast to their breeding grounds in Alaska. The fall flights are over the same routes.

Spring Migration Dates

ATLANTIC COAST		Peak
Maryland .....	Mar. 10–April 14	
Pennsylvania and New Jersey .....	Mar. 17–May 10	
New York (western) ..	Mar. 12–May 5	Mar. 20–April 20
Ontario (southern) ..	Mar. 27–May 5	April 1–May 5
Quebec .....	April 9–May 13	April 15–May 12
Nova Scotia .....	Feb. 21–April 27	Mar. 16–April 2
INTERIOR		
Louisiana .....	Feb. 15–Mar. 14	
Oklahoma .....	Feb. 17–Mar. 29	
Kansas, Nebraska ..	Feb. 16–April 7	
Illinois .....	Jan. 11–April 1	
Michigan .....	Mar. 21–April 22	
Wisconsin, Minnesota	Mar. 5–May 10	
No. and So. Dakota ..	Mar. 1–May 19	
So. Manitoba and Saskatchewan .....	April 8–May 15	
Ontario (James Bay)	April 23	
WEST COAST		
California .....	Feb. 25–April 10	
Oregon .....	Feb. 1–May 1	
Washington .....	Mar. 6–Apr. 23	

Fall Migration Dates

ATLANTIC COAST		Peak
Ontario and Quebec ..	Sept. 30–Oct. 28	
Vermont .....	Oct. 8–Nov. 23	
New York .....	Oct. 7–Nov. 20	
Pennsylvania .....	Sept. 30–Nov. 6	
New Jersey .....	Oct. 12–Oct. 25	
Maryland .....	Oct. 1–Nov. 20	Oct. 15–Nov. 5
Virginia .....	Oct. 8–winters	
INTERIOR		
Manitoba .....	Oct. 3–Oct. 15	
Montana .....	Oct. 2–Oct. 28	
No. and So. Dakota ..	Sept. 30–Nov. 26	
Minnesota, Wisconsin, and Michigan ....	Sept. 22–Nov. 20	
Illinois and Indiana ..	Sept. 22–Dec. 8	
Kansas .....	Oct. 16–winters	
Missouri, Arkansas ..	Oct. 2–Nov. 29	
Louisiana, Texas ....	Sept. 23–Oct. 28	
WEST COAST		
California .....	Sept. 1–Nov. 10	Oct. 21
Oregon .....	Sept. 1–Sept. 12	Sept. 1–3
Washington .....	Sept. 6–Nov. 11	

**Flight**—Canada geese can fly several hundred miles non-stop. The vast majority of geese appear to migrate at altitudes between 3,000 and 8,000 feet; some have been observed at 15,000 feet.

SNOW GEESE

Snow geese and blue geese in numbers totaling 400,000 to 500,000 move down the Mississippi Valley on such a broad front in the fall that they are likely to pass over or near most of the airports in the Valley. They concentrate at several places along the Illinois, Mississippi, and Missouri Rivers, but seldom in numbers over 25,000. When they leave their gulf coast wintering grounds in March, the bulk of the population moves en masse to northwest Missouri and southwest Iowa. From there, they gradually move up the Missouri River Valley to Sand Lake and Putney Slough, South Dakota. The movement of several hundred thousand blue and snow geese to the Missouri River Valley north of St. Joseph, Missouri, and their gradual movement up this valley creates conditions hazardous to aircraft in the vicinity of airports at Kansas City, Omaha, Sioux City, and Sioux Falls.

**Migration**—Lesser snow geese migrate over a broad front through the Mississippi River Valley, with the center of the spring flight passing over Louisiana, Arkansas, Missouri, Iowa, Minnesota, South Dakota, and North Dakota. The fall flight spreads farther east, reaching into Michigan, Ohio, and Indiana. Birds that winter in the Central Valley of California migrate through Tule Lake in northern California, Malheur Lake in Oregon, and along the coast of British Columbia. There also may be an overland flight between Malheur Lake and the Canadian Arctic.

Greater snow geese migrate almost nonstop from wintering grounds to breeding grounds. They migrate northward along the Atlantic coast of the United States and then inland (up the Hudson and Connecticut Rivers) to a stopover area on the St. Lawrence, at Cap Tourmente, Quebec. From there, the line of flight presumably is overland through Ungava to the breeding grounds.—The fall flight is over the same route.

Spring Migration Dates

ATLANTIC COAST		Peak
(Greater Snow Geese)		
North Carolina .....	Inst–Mar. 1	
Delaware Bay .....	Feb. 25–April 6	Mar. 26–Mar. 29
St. Lawrence River, Quebec .....	Mar. 11–May 27	Mar. 25–April 29
Baffin Island (65°N)	first–May 29	
INTERIOR		
(Lesser Snow Geese)		
Texas and Louisiana	Mar. 1–Mar. 29	Mar. 15
Oklahoma and Arkansas .....	Feb. 28–April 1	
Kansas and Missouri	Feb. 24–April 13	Mar. 10–April 13
Nebraska and Iowa ..	Feb. 26–April 19	Mar. 20–April 2
North and South Dakota, Minnesota and Wisconsin ...	Mar. 2–May 10	Mar. 19–May 4
Southern Manitoba ..	Mar. 27–May 17	April 18–May 13
Ontario (James Bay)	April 25–June 8	
WEST COAST		
(Lesser Snow Geese)		
Nevada .....	Feb. 1–Mar. 10	Mar. 10
California (Sacramento) ....	Feb. 1–Mar. 27	Feb. 20–Mar. 27
California (northern) .....	Feb. 19–April 15	Mar. 4–Mar. 29
Oregon .....	Mar. 9–April 22	Mar. 25–April 15
Washington .....	April 3–May 9	
British Columbia ...	April 10–May 22	
Alaska .....	April 16–May 31	April 19



SNOW GEESE—Continued

Fall Migration Dates		
ATLANTIC COAST		
(Greater Snow Geese)		
Baffin Island -----	last–Sept 15	
St. Lawrence River,		
Quebec -----	Sept 1–Oct. 21	
New York -----	Oct. 8–Nov. 21	
Brigantine, New		
Jersey -----	Oct. 8–Dec. 10	
Delaware Bay, Chin-		
coteague Bay, Back		
Bay, Virginia, and		
North Carolina ---	Oct. 14–winters	Nov. 1–Dec. 30
INTERIOR		
(Lesser Snow Geese)		
Franklin (Coats	large flocks leaving	
Island -----	Sept. 3	
Ontario (James Bay)	Sept. 15–Nov. 10	Oct. 3–Oct. 30
Southern Manitoba -	Oct. 5–Oct. 31	
North Dakota and		
Minnesota -----	Oct. 5–Nov. 15	
Wisconsin and		
Michigan -----	Oct. 5–Nov. 16	
Iowa, Illinois, and		
Missouri -----	Oct. 5–Nov. 21	Nov. 1
Louisiana -----	Oct. 5–winters	Oct. 10–Dec. 1
Texas -----	Oct. 13–winters	Oct. 20–Dec. 1
WEST COAST		
(Lesser Snow Geese)		
Alaska -----	Sept. 4–Sept. 15	
British Columbia ---	Sept. 28–Oct. 30	Oct. 22–Oct. 30
Washington -----	Sept. 28–Nov. 22	
Oregon -----	Sept. 28–Nov. 22	Oct. 9–Oct. 30
California -----	Oct. 4–winters	Oct. 4–Nov. 1
Alberta -----	Sept. 20–Nov. 1	Oct. 9
Montana -----	Oct. 10–Nov. 24	
Idaho -----	Oct. 27–Nov. 25	
Utah -----	Sept. 25–Dec. 20	Oct. 9–Oct. 15
Nevada -----	Sept. 20–Oct. 18	Oct. 10–Oct. 16

Flight—Lesser snow geese are good fliers, capable of making long distance, nonstop flights. Many stopover locations are used. An altitude of 3,000 feet has been estimated. Greater snow geese have been reported between 800 and 1,500 feet, and probably go much higher.

MALLARDS AND PINTAILS

Mallards and Pintails are included partly because they are the commonest North American ducks, but more specifically because they concentrate in very large numbers in the Mississippi Valley and in the Central Valley of California. Each migration season about 7 million to 15 million ducks pass through the Mississippi Valley; 3 million to 6 million use the Central Valley of California; and 2 million to 3 million migrate through the Atlantic Coastal States.

More ducks pass in the vicinity of Lambert Field, St. Louis, than any other major air terminal east of the Rocky Mountains, no doubt because of the channeling effect of the Illinois and Mississippi Rivers. The number of ducks migrating over St. Louis is several times greater than at Kansas City, Des Moines, or Minneapolis. However, even these airports have such large numbers of ducks passing in their vicinity as to create hazardous conditions for departing and incoming aircraft. Airports at Sioux Falls, Sioux City, Omaha, Moline, Memphis, and

New Orleans are about equally subject to the possibility of strikes by ducks as at Kansas City, Des Moines, and Minneapolis.

Airports at Detroit, Toledo, and Cleveland occur in a third level of potential danger from duck strikes. A somewhat smaller passage of ducks, largely lesser scaup canvas back and redheads, extends in an east-southeast direction from central Minnesota to the Chesapeake Bay area. En route these ducks concentrate in especially large numbers at Lake St. Clair and the Detroit River.

Migration—Mallards migrate over a broad front, covering most of the Western States. The heaviest concentrations are through the Mississippi and Missouri River Valleys. There is also a flight along the west coast.

Spring Migration Dates		
INTERIOR		
Kansas -----	Feb. 24–Mar. 25	
Nebraska -----	Mar. 2–Mar. 27	
Iowa -----	Mar. 16–April 10	
Illinois and Indiana -	Mar. 1–April 2	
Michigan -----	Mar. 14–May 5	
Wisconsin and		
Minnesota -----	Mar. 16–April 28	
North and South		
Dakota -----	Mar. 28–April 20	
Saskatchewan -----	April 14–May 5	
WEST COAST		
Washington -----	Feb. 28–Mar. 31	
Fall Migration Dates		
INTERIOR		
Alberta -----	Sept. 28–Oct. 14	
Saskatchewan and		
Manitoba -----	Sept. 19–Nov. 9	
Montana -----	Aug. 30–Nov. 2	
North Dakota -----	Aug. 9–Nov. 15	Sept. 11–Oct. 18
Minnesota and		
Wisconsin -----	Sept. 5–Nov. 24	about Oct. 15
South Dakota and		
Nebraska -----	Sept. 11–Nov. 9	
Iowa, Illinois, Kan-		
sas, and Missouri -	Oct. 4–Nov. 20	about Nov. 11
Arkansas -----	Oct. 24–winters	
WEST COAST		
Washington -----	Sept. 6–Nov. 28	

Migration—Pintails migrate over a broad front, covering most of the Western States. The main flights are through the interior and the Pacific States. In the fall there are more pintails in the Pacific States than in the interior of the continent, but in the spring the heaviest flight is through the Great Plains. In the spring and fall in the East, there are flights between Chesapeake Bay and the Great Lakes, and also along the Atlantic coast and the St. Lawrence River.

Spring Migration Dates		
ATLANTIC COAST		
Maryland -----	Feb. 15–Mar. 20	Mar. 5
Pennsylvania -----	Mar. 3–April 1	
New York -----	Mar. 5–April 26	April 26
Vermont -----	April 13–April 30	



**PINTAILS—Continued**

Spring Migration Dates		
<b>INTERIOR</b>		<i>Peak</i>
Texas -----	Jan. 9-Mar. 25	Jan. 12-Mar. 9
Louisiana and Arkansas -----	Jan. 27-Mar. 20	
Kansas, Missouri, and Kentucky ----	Feb. 10-May 3	Feb. 28-Mar. 26
Nebraska and Iowa -	Feb. 26-April 22	Feb. 27-Mar. 25
Minnesota, Wisconsin, and Michigan ----	Mar. 14-May 5	April 4-April 18
North and South Dakota -----	Feb. 26-April 28	April 16
Idaho and Montana	Mar. 18-April 30	Mar. 19-Mar. 29
Manitoba and Saskatchewan ---	Mar. 26-May 9	
<b>WEST COAST</b>		
California -----	winters-April 2	Mar. 2-April 2
Oregon -----	Feb. 20-Mar. 23	Mar. 2-Mar. 4
Washington -----	Mar. 9-Mar. 22	
British Columbia --	Mar. 22-April 25	Mar. 27
Alaska -----	April 21-May 8	April 28
Fall Migration Dates		
<b>ATLANTIC COAST</b>		<i>Peak</i>
New York -----	Oct. 15-Nov. 15	
Maryland -----	Oct. 25-Dec. 10	Nov. 13-Dec. 6
<b>INTERIOR</b>		
Saskatchewan and Manitoba -----	Aug. 10-Oct. 20	
North and South Dakota -----	Sept. 1-Nov. 19	
Minnesota and Wisconsin -----	Sept. 10-Nov. 19	
Michigan -----	Sept. 10-Oct. 14	Sept. 26
Nebraska, Iowa, and Kansas -----	Sept. 15-Nov. 28	Oct. 15-Oct. 20
Mississippi, Arkansas, and Louisiana -----	Sept. 20-winters	Oct. 10-Nov. 25
Texas -----	Sept. 20-winters	Oct. 25-Dec. 10
<b>WEST COAST</b>		
British Columbia and Washington --	Aug. 28-Dec. 14	Oct. 18-Nov. 7
Oregon -----	Sept. 2-Dec. 16	
Idaho -----	Sept. 30-Dec. 10	
California -----	Sept. 19-winters	Oct. 30

**DOUBLE-CRESTED CORMORANTS**

The double-crested cormorant is a large, dark water-bird similar in size and shape to a goose, but with very different habits. Cormorants usually migrate in flocks of 20 to 200 individuals, following the shoreline closely and generally staying below 1,000 feet. They are of concern primarily to airports in the immediate vicinity of the coast.

**Dates of occurrence.** Although the great bulk of the migration of any particular species passes a given point during a period of about 3 to 4 weeks in spring and 4 to 6 weeks in fall, scattered flocks or individuals occur several weeks earlier and later than the peak movement. The timing of the peak movement may be shifted a week or two if unseasonably warm or unseasonably cold weather prevails at the point of origin. The dates given in the figures cover the normal range of variation for the peak flights, but *do not* include the entire period during which small flights can be expected.

**Migration**—The flocks follow closely along coastlines (coastal bays and immediate offshore waters), river valleys, and water courses, even avoiding visible short-cuts. The outstanding exception is the overland route that many birds take in the fall from Boston Bay, southwestward across Massachusetts to coastal Rhode Island.

Spring Migration Dates		
		<i>Peak</i>
North Carolina ----	Mar. 15-May 10	1st week April
Virginia and New Jersey -----	Mar. 21-May 22	3rd week April
Long Island -----	April 1-May 31	4th week April
Massachusetts and Maine -----	April 5-June 10	1st week May

Fall Migration Dates		
		<i>Peak</i>
Maine and Massachusetts ---	Aug. 25-Nov. 1	September
Long Island -----	Sept. 1-Nov. 1	early October
Maryland -----	Sept. 10-Nov. 10	late October
Florida -----	Oct. 15-Dec. 10	

**Flight**—Cormorants usually fly at low levels, but may go up to 3,000 feet. They fly low over water, higher over land, and migrate both by day and night. The usual migratory flock contains fewer than 200 birds, but some flocks contain as many as 1,000.